

Writing at a Distance: Notes on Authorship and Artificial Intelligence

Hannes Bajohr

Abstract: This essay provides an overview of notions of authorship in AI and natural language processing systems, and discusses past and current debates on computers as literary authors. It suggests the concept of *causal authorship* to measure the types of distance between human and machine agents, acknowledging the anthropocentric bias of this idea. To balance this, the essay reflects on the notion of *distributed authorship*, which considers the network of actors involved in the creation of text, which has its own limitations. Both concepts are elements for a future theory of authorship in the age of machine learning.

Keywords: artificial intelligence, large language models, electronic literature, authorship

With the advent of OpenAI's ChatGPT, Anthropic's Claude, Google's Bard, and other text-generating machine learning systems, the old boundaries between the "two cultures" of the humanities on the one hand and what is now called STEM on the other seem to be fraying by the day.¹ As "large language models" become more sophisticated and capable of producing writing that is, at least in certain instances, indistinguishable from human-written text, it is less and less clear that the instance of writing can be so easily located. This is not only a challenge for literary studies, for which the discussion of the "author function," is one of its core competencies.² Engineering – the "E" in STEM – in the form of artificial intelligence research, too, must ponder this question, since the goal of a strong AI presupposes that computers are autonomous agents, and as such can potentially claim authorship.³ And while literary studies have traditionally sought to deconstruct the singular and autonomous author-genius, current

¹ C. P. Snow, *The Two Cultures* (Cambridge: Cambridge University Press, 2012).

² See, for an overview, Philipp Löffler and Tim Sommer, "Introduction: Institutions of Authorship," *Authorship* 11, no. 1 (January 31, 2023).

³ For the distinction between strong and weak AI, see John R. Searle, "Minds, Brains, and Programs," *Behavioral and Brain Sciences* 3, no. 3 (1980): 417–57. For the distinction between strong and weak *artistic* AI, see Hannes Bajohr, "The Paradox of Anthroponormative Restriction: Artistic Artificial Intelligence and Literary Writing," *CounterText* 8, no. 2 (August 2022): 262–82.

fantasies about AGI (artificial general intelligence) perform a return of romantic ideas of geniuses in machinic form.⁴

Authorship, in other words, is now a benchmark for computer science, as evidenced by collaborative programs like Google's *Artists and Machine Intelligence*.⁵ However, what appears novel often has a long history, and computer-generated language is almost as old as computers themselves.⁶ Natural language processing (NLP) can be traced back to the 1940s,⁷ when Warren Weaver's memorandum on the need for machine translation opened up a promising field of research in the young discipline of computer science,⁸ and has often been cited as the "birth" of automated language processing.⁹

Even then, the question of authorship of synthetic text has played an unacknowledged role in the broader field of artificial intelligence. Alan Turing's famous 1950 "imitation game," later known as the "Turing test," was a pivotal moment in this regard. Turing argued, in good behaviorist fashion, that in order to test whether a machine was intelligent, it had to be able – at least in terms of its conversational abilities – to fool a human into thinking that it, too, was a human.¹⁰ Since for technical reasons this conversation would have to be textually mediated, this means that "artificial intelligence is the art of making texts," as Jay David Bolter put it already back in 1991.¹¹ Authorship has thus been a central concern in AI research from the very beginning, since any text generated by a machine must convey a sense of intentionality if it is to be considered intelligent.

Until recently, however, the potential of AI-generated language remained largely untapped

⁴ It is revealing how common the word "genius" is in the interviews with computer scientists collected in Arthur I. Miller, *The Artist in the Machine: The World of AI-Powered Creativity, The Artist in the Machine* (Cambridge, Mass.: MIT Press, 2019). Adrian Daub describes how the word "genius" forms a core tenet of current Silicon Valley ideology, Adrian Daub, *What Tech Calls Thinking: An Inquiry into the Intellectual Bedrock of Silicon Valley* (New York: Farrar, Straus, and Giroux, 2020), chap. 3.

⁵ "Google Artists and Machine Intelligence," accessed March 18, 2023, <http://ami.withgoogle.com>.

⁶ Christopher T. Funkhouser, *New Directions in Digital Poetry* (New York: Continuum, 2012); Saskia Reither, *Computerpoesie. Studien zur Modifikation poetischer Texte durch den Computer* (Bielefeld: Transcript, 2003).

⁷ Nils J. Nilsson, *The Quest for Artificial Intelligence: A History of Ideas and Achievements* (Cambridge: Cambridge University Press, 2010), 103–13.

⁸ Warren Weaver, "Translation," [1949] in *Readings in Machine Translation*, ed. Sergei Nirenburg, H. L. Somers, and Yorick Wilks (Cambridge, Mass: MIT Press, 2003), 13–17.

⁹ Michael D. Gordin, *Scientific Babel: How Science Was Done Before and After Global English* (University of Chicago Press, 2015), 213–40.

¹⁰ Alan M. Turing, "Computing Machinery and Intelligence," *Mind* 59, no. 236 (1950): 433–60.

¹¹ Jay David Bolter, "Artificial Intelligence," in *Writing Space. The Computer, Hypertext, and the History of Writing* (Hillsdale, NJ: Erlbaum, 1991), 180.

due to the fact that AI text production was primarily situated *outside* literary contexts. The users of Joseph Weizenbaum’s 1964 ELIZA program, for example – the earliest interactive chatbot, which simulated a Rogerian psychoanalyst – accepted the computer against their better judgment as an intentional communication partner; they famously began having serious and private conversations with it.¹² But it would be incorrect to say that they also saw ELIZA as an *author* in the specifically literary meaning of the word. The production of explicitly literary texts – and the associated distinction of a specifically literary “mode of being of discourse” as well as the “classificatory function” of work coherence and intellectual ownership,¹³ for which the term authorship is normally reserved in its emphatic meaning – was simply not a priority for mainstream AI development.¹⁴ Instead, these ideas were explored mainly in the artistic-experimental fringes of NLP.¹⁵

This essay takes up the parallelism of intentionality and authorship on the one hand and NLP and AI on the other in order to give, in a first part, an overview of past and present debates about computer authorship, and to show some continuities that connect them to the more traditional discourse of literary studies, as well as the surprisingly old discussion about the artistic use of the computer. Because the line between “AI” and mere computer use is often difficult to draw, I will briefly summarize the historical debates about authorship of computer-generated literary texts before systematically addressing authorship specific to the narrower field of AI; many of the themes of the former recur in the latter.

It would, however, be wrong to assume that there is absolutely nothing new under the sun. In particular, the shift to statistical reasoning as the base technology of AI research is a genuinely novel phenomenon that requires novel concepts for describing authorship in and around these systems. The second part of this essay, thus, introduces the idea of *causal authorship* as a measure of the distance between human and machine agent that has no parallel in the history of authorship.

¹² Joseph Weizenbaum, “ELIZA: A Computer Program for the Study of Natural Language Communication Between Man And Machine,” *Communications of the ACM* 9, no. 1 (1966): 36–45.

¹³ Michel Foucault, “What Is an Author?,” in *Aesthetics, Method, and Epistemology*, ed. James D. Faubion (New York: New Press, 1998), 211, 210.

¹⁴ Outside of this mainstream, however, there have been experiments with narrative structures in AI research, such as James Meehan’s TAIL-SPIN or Terry Winograd’s SHRDLU. See Leah Henrickson, *Reading Computer-Generated Texts* (Cambridge: Cambridge University Press, 2021), 11–14.

¹⁵ See for an alternative view of the entanglement of AI and NLP Avery Slater, “Post-Automation Poetics; or, How Cold-War Computers Discovered Poetry,” *American Literature* 95, no. 2 (June 1, 2023): 205–27.

However, causal authorship is only a heuristic tool, and still thinks of the human at the end of the chain of operations as the author. Thus, the third section attempts to counter this overly anthropocentric scheme with a notion of *distributed authorship* that is spread across a network of many actors; this model, however, has its own problems as it makes it more difficult to address political and ethical concerns. Both notions of authorship, then, should be seen as checking each other, and are open to being extended. For what I present here is after all only a first sketch. It expresses the need to rethink authorship in the age of large language models and while it leaves many questions open, it can serve as a basis for a more in-depth exploration of the topic.

1. Historical Outline of Computer-Generated Literature

Christopher Strachey, a colleague of Turing's at Manchester University, is credited with creating the first literary experiment using a computer. His "Love Letters" were produced in 1952 on the Manchester Mark I and printed out by teletype. These letters were generated through a combinatorial process in which a set of fixed words were inserted into a variety of possible word patterns for a love letter,¹⁶ each of which was signed "M.U.C." (Manchester University Computer).

Already here, the computer is presented as an author – but only in the sense of a playful authorship *fiction*, hardly very different from that of E.T.A. Hoffman's tomcat Murr. Strachey never claimed that the computer actually assumed the role of the author, but rather saw such notions as an anthropomorphic projection. He stated that the question was not whether computers were capable of writing letters, but rather whether one could write a program for that purpose – "and this is really a very different sort of question because the writing of programs ... is still an essentially human activity."¹⁷ Authorship therefore rested with the programmer, not the computer. Like Turing, however, Strachey considered the *possibility* of successfully deceiving readers – and thus implicitly the assumption of computer authorship – not only possible but probable in the future.¹⁸

¹⁶ Noah Wardrip-Fruin, "Christopher Strachey: The First Digital Artist?," *Grand Text Auto*, 2009, <https://grandtextauto.soe.ucsc.edu/2005/08/01/christopher-strachey-first-digital-artist/>.

¹⁷ Christopher Strachey, "The 'Thinking' Machine," *Encounter*, no. 3 (1954): 25–26.

¹⁸ *Ibid.*, 31.

In the German context, the information aesthetics of the Stuttgart School, centered around philosopher and writer Max Bense, introduced a new perspective on authorship that complicated previously established ideas by pointing out their ontological assumptions. While Strachey, following Turing's proposal, emphasized the *appearance* of intentionality as a precondition of authorship – and recommended clever programming as a way of bringing about this deception – information aesthetics articulated a break in the ontology of the text itself.

In his essay “Über natürliche und künstliche Poesie” (“On Natural and Artificial Poetry”), Bense ascribes to the former “an ego relation and a world aspect” that continue to operate in a text as an “ontological continuation” of personal or social experiences of the world. By contrast, “artificial poetry” has, in principle, no intentional and subject-relative, but only a “material origin.” It consists of contextless textual elements that lack any human meaning, but whose aesthetic content can be independently measured on the basis of communication theory and the statistical improbability of symbol sequences.¹⁹

This view relativizes the question of authorship by prioritizing text-immanent criteria over the author's identity. Understood this way, computer-generated texts lack intentionality by definition, rendering the Turing test a category mistake. The fact that Bense could speak of “simulated poetry”²⁰ highlights this ontological distinction rather than eliminating it, aligning his text theory with the discourse on the “death of the author” of Roland Barthes, Michel Foucault, and Umberto Eco.²¹

The focus on the quantitative properties of text, such as word frequency and vocabulary distribution, is also evident in Theo Lutz's “Stochastic Texts” of 1959, regarded as the first computer-generated literature in the German-speaking world. Lutz, a student of Bense's, tasked a program to combine a list of words into short sentences by a weighted random process. The fact that the vocabulary used came from Kafka's *Schloß* does not contradict the devaluation of

¹⁹ Max Bense, “Über natürliche und künstliche Poesie,” in *Theorie der Texte: Eine Einführung in neuere Auffassungen und Methoden* (Köln: Kiepenheuer & Witsch, 1962), 143–47. An English translation is extant online: Max Bense, “On Natural and Artificial Poetry,” March 13, 2023, <https://hannesbajohr.de/en/2023/03/13/max-bense-on-natural-and-artificial-poetry-1962/>.

²⁰ Max Bense, *Ästhetik und Texttheorie*, ed. Elisabeth Walther, *Ausgewählte Schriften*, vol. 3 (Stuttgart: Metzler, 1998), 385.

²¹ Roland Barthes, “The Death of the Author,” in *Image, Music, Text: Essays*, trans. Stephen Heath (London: Fontana, 1977), 142–48. I cannot discuss the background of this well-known debate here, but see the still useful book by Seán Burke, *The Death and Return of the Author: Criticism and Subjectivity in Barthes, Foucault and Derrida* (Edinburgh University Press, 2008).

the authorship question, but is only intended to ensure an inherent aesthetic valence.²²

Lutz, however – less interested in theory than Bense – seems to have related his own authorship primarily to the *program script*, while treating the output only as its secondary effect.²³ As with Strachey, Lutz’s work is situated in the realm of NLP, not AI; he explicitly declares it to be the synthetic counterpart of an “analytic philology.”²⁴ Something similar can be said of the linguist Gerhard Stickel’s “autopoems,” generated from 1964 onward, which function according to a comparable pattern. Stickel, too, considered the assumption of computer authorship to be an inadmissible anthropomorphization, “justified only by ignorance of its mode of operation.”²⁵

What these two examples show is that it is not the search for autonomously acting, problem-solving or even consciousness-equivalent machines, but the analysis of syntactic structures that appears as the starting point of computer-generated literature. This setting, however, deprivileges the authorship question quite pragmatically (in the case of Lutz and Stickel) or through a strong notion of text on a theoretical level (as in the case of Bense). Where the linguistic or computer science approach increasingly gives way to an artistic one, it seems that in many cases the poetological interest in the “death” of the human author has also prevented its resurrection as a *computer* author.²⁶

This is evident in the generative texts of the 1960s and 1970s, which tended to be produced in the context of modernist aesthetics that experimented with aleatoric processes in the wake of John Cage and Marcel Duchamp, rather than projecting authorship, let alone “genius,” onto machines. The relevant works of the period, at least, seem to indicate as much. The French group OuLiPo (L’Ouvroir de littérature potentielle), working with self-imposed constraints, was from the start interested in mathematized text creation; its member Jean Baudot published *La machine à écrire* in 1967, a collection of free verse generated with his software PHRASE.²⁷ Marc Adrian’s “Maschinentexte,” begun in the late 1950s and working with

²² Theo Lutz, “Stochastische Texte,” *Augenblick* 4, no. 1 (1959): 3–9.

²³ Toni Bernhart, “Beiwerk als Werk: Stochastische Texte von Theo Lutz,” *editio*, no. 34 (2020): 194.

²⁴ Theo Lutz, “Über ein Programm zur Erzeugung stochastisch-logistischer Texte,” *Grundlagenstudien aus Kybernetik und Geisteswissenschaft* 1, no. 1 (1960): 11, 14; similarly, see Bense, *Ästhetik und Texttheorie*, 3:384.

²⁵ Gerhard Stickel, “Computerdichtung: Zur Erzeugung von Texten mit Hilfe von datenverarbeitenden Anlagen,” *Der Deutschunterricht* 18, no. 2 (1966): 123.

²⁶ Jürgen Schäfer, “Passing the Calvino Test? Writing Machines and Literary Ghosts,” in *Digital Media and Textuality: From Creation to Archiving*, ed. Daniela Côrtes Maduro (Bielefeld: Transcript, 2017), 29.

²⁷ Jean Baudot, *La machine à écrire* (Montreal: Editions du Jour, 1964).

permutations and loops, stem in a direct line from the linguistic avant-gardism of the Vienna group around Gerhard Rühm and H. C. Artmann.²⁸ In the case of Alison Knowles and James Tenney's "A House of Dust" (1968), the collaboration between art (Knowles) and engineering (Tenney) is also reflected in the equality of the authorial duo.²⁹ But when Dick Higgins, who like Knowles belonged to the Fluxus movement, argued for the use of "computers for the arts" two years later, he continued to do so under the proviso that "Computers are like most tools – deaf, blind and incredibly stupid."³⁰

Whenever a conscious *staging* of authorship occurs, it is hardly taken very far at this point: for the collection of *Computer-Lyrik* (1968) – comprising poems that emulate both classical authors as Goethe and contemporary poets like Paul Celan – the programmers Manfred Krause and Götz F. Schaudt merely signed as editors, thus conceding authorship to the machine on a paratextual level; in the preface, however, this gesture is retracted and the computer is referred to as "only a tool in our hand."³¹ The poet Karl Krolow, who reviewed the volume the same year, nevertheless played along and, with tongue-in-cheek seriousness, ascribed authorship to "Zuse Z 23, one-year-old computer poet."³²

The discrepancy between the production and reception of computer literature is striking: for many critics, it serves as a foil for man-machine comparisons – either indicating an irreducible human capacity for "real" literature, as Italo Calvino locates this capacity in the rootedness of every story in myth,³³ or suggesting a mere measure of craft, as Hans Magnus Enzensberger put it in 1974: "Whoever cannot write poetry better than the machine would do better to not do it at all."³⁴ Despite this repetition of technocritical tropes,³⁵ the discussion of

²⁸ Marc Adrian, *Die Maschinentexte: Montagen, Textsynthesen, Computergenerierte Texte und Permutationen. Sammlung 1966-1992*, ed. Gerald Ganglbauer (Stattegg: Gangan, 2020); see for Adrian's description of his own relationship to the Vienna group Marc Adrian, *Inventionen* (Linz: edition neue texte, 1980), 5.

²⁹ Hannah B. Higgins, "An Introduction to Alison Knowles's The House of Dust," in *Mainframe Experimentalism: Early Computing and the Foundations of the Digital Arts*, ed. Hannah B. Higgins and Douglas Kahn (Berkeley, 2012), 195–99.

³⁰ Dick Higgins, *Computers for the Arts* (Somerville: Abyss, 1970), 1.

³¹ Manfred Krause and Götz F. Schaudt, eds., *Computer-Lyrik* (Düsseldorf: Droste, 1968), 8.

³² Karl Krolow, "Die Seele wimmert," *Die Tat*, January 13, 1968, 33.

³³ Italo Calvino, "Cybernetics and Ghosts," in *The Uses of Literature*, trans. Patrick Creagh (San Diego: Harcourt Brace Jovanovich, 1986), 3–27.

³⁴ Hans Magnus Enzensberger, *Einladung zu einem Poesie-Automaten* (Frankfurt am Main: Suhrkamp, 2000), 52. Despite the late publication date, Enzensberger insists that his reflections on computer literature were completed in 1974.

³⁵ Stefan Rieger, "Bin doch keine Maschine ...". Zur Kulturgeschichte eines Topos," in *Machine Learning: Medien, Infrastrukturen und Technologien der Künstlichen Intelligenz*, ed. Christoph Engemann and Andreas Sudmann

authorship remained conspicuously secondary for those producing such literature.

Austrian authors Franz Josef Czernin and Ferdinand Schmatz developed the rule-based poetry generator POE (“Poetic Oriented Evaluations”) in the late 1980s, which analyzed the character distribution of a text, including its phonetic qualities, and allowed transformations and substitutions. Thus, Hölderlin’s poem “Andenken,” with the first line “Wo aber sind die Freunde? Bellarmin” could be transformed into the line “sog aber licht, die leuchten wellenartig” in Czernin/Schmatz’s poem “tag.”³⁶ POE, too, was only “meant to be an assistant,” as Czernin recently, and with an eye to ChatGPT, stressed in an interview: “We were explicitly not interested in the machine producing works itself.”³⁷

This attitude however also changed in the 1980s with the publication of the book *The Policeman’s Beard is Half Constructed* (1984), in which the staging of autonomous machine authorship is taken to an unprecedented extreme: advertised on the cover as “the first book ever written by a computer,” the program “Racter” figures as the author.³⁸ The lavish book edition, complete with images that look like a cross between stills from the movie *Tron* and the xylographs of Max Ernst, no longer stands for a playful, transparent fiction of computer authorship, but for its serious assertion.

William Chamberlain and Thomas Etter, the developers of Racter (although Etter himself may have been fictional), have since come under some criticism for neither publishing the program code nor revealing the depth of their editorial intervention. As a result, *The Policeman’s Beard* is now considered a highly controversial key work of generative literature.³⁹ Significantly, the back cover of the book distinguishes Racter from AI: “Fundamentally different from artificial intelligence programming, which attempts to replicate human thinking, Racter can write

(Bielefeld: Transcript, 2018), 117–42; Philipp Schönthaler, *Die Automatisierung des Schreibens und Gegenprogramme der Literatur* (Berlin: Matthes & Seitz, 2022).

³⁶ Franz Josef Czernin and Ferdinand Schmatz, “Notes about the Poetry Program POE,” *Ars Electronica Archive*, 1990, https://webarchive.ars.electronica.art/en/archives/festival_archive/festival_catalogs/festival_artikel.asp%3FiProjectID=8950.html; see also Peter Weibel, “Algorithmus und Kreativität: Algorithmendesign in der Literatur,” in *Woher kommt das Neue? Kreativität in Wissenschaft und Kunst*, ed. Walter Berka and Christian Smekal (Vienna: Böhlau, 2003), 85–97.

³⁷ Roland Pohl, “Kann künstliche Intelligenz Lyrik? Nein, meint der Dichter Czernin,” *Der Standard*, February 23, 2023, <https://www.derstandard.at/story/2000143824279/autor-czernin-ein-kreatives-programm-muesste-absichten-haben>.

³⁸ Racter, *The Policeman’s Beard Is Half Constructed* (New York: Warner, 1984).

³⁹ Leah Henrickson, “Constructing the Other Half of The Policeman’s Beard,” *Electronic Book Review*, 2021, 20.

original work without promptings from a human operator.” Autonomous machine authorship is declared here to *transcend* the paradigm of AI, which should be seen not least in the light of an AI discourse that regained momentum in the 1980s.

Indeed, the 1980s were something of a crossroads. The development of text-based AI and generative writing had long run in parallel. Weizenbaum’s ELIZA had shown that a computer could pass the Turing test at least for a short time. However, literary interest in text generators waned in the late 1980s and 1990s. Instead, an entirely different form of computer-centered writing emerged in the form of hypertext literature, which privileged modes of reception rather than production, and sent readers down “forking paths.”⁴⁰ In contrast to early NLP, which was entirely removed from the high theory of the 1970s and 1980s, hypertext literature can be considered poststructuralism turned technology: since hypertext structures allow for multiple reading paths, they not only replace the authoritarian “tree” with the anarchic “rhizome,”⁴¹ they also strip the author of his or her power, who is now a mere *scripteur* of collections of material,⁴² and valorize the reader as the actual meaning-making agent. New figures were proposed, such as the “wreader”⁴³ or the “browser,”⁴⁴ who forge their own nonlinear paths through the linked sections of text.⁴⁵

However, the insistence on the “networking aspect”⁴⁶ and the “interactivity, intermediality, and staging”⁴⁷ of reception, on which scholars of the time focused, tended to obscure the

⁴⁰ Jorge Luis Borges, “The Garden of Forking Paths,” in *Ficciones*, ed. Anthony Kerrigan, trans. Helen Temple and Ruthven Todd (New York: Grove Press, 1962), 89–101; Nick Montfort, *Twisty Little Passages: An Approach to Interactive Fiction* (The MIT Press, 2003).

⁴¹ Gilles Deleuze and Félix Guattari, *A Thousand Plateaus*, trans. Brian Massumi (Minneapolis: University of Minnesota Press, 1987), 3–25.

⁴² Barthes, “The Death of the Author”; see for a discussion of specifically digital authorship in a specifically German context Florian Hartling, *Der digitale Autor: Autorschaft im Zeitalter des Internets* (Bielefeld: Transcript, 2009), 97–109.

⁴³ George P. Landow, *Hypertext: The Convergence of Contemporary Critical Theory and Technology* (Baltimore: Johns Hopkins University Press, 1992), 14.

⁴⁴ Carolyn Guertin, “Wanderlust: The Kinesthetic Browser in Cyberfeminist Space,” *Extensions: Online Journal of Embodiment and Technology*, no. 3 (2007), <https://web.archive.org/web/20150921150355/http://www.performancestudies.ucla.edu/extensionsjournal/guertin.htm>; see also Jasmin Meerhoff, “Verteilung und Zerstäubung: Zur Autorschaft computergestützter Literatur,” in *Digitale Literatur II*, ed. Hannes Bajohr and Annette Gilbert (München: edition text+kritik, 2021), 49–61.

⁴⁵ That the very notion of authorship, in fact, did not disappear is discussed in Robert Coover, “Goldene Zeitalter. Vergangenheit und Zukunft des literarischen Wortes in den digitalen Medien,” *Text+Kritik*, no. 152 (2001): 22–30.

⁴⁶ Christiane Heibach, “Ins Universum der digitalen Literatur: Versuch einer Typologie,” *Text+Kritik*, no. 152 (2001): 32.

⁴⁷ Roberto Simanowski, “Autorschaften in digitalen Medien: Eine Einleitung,” *Text+Kritik*, no. 152 (2001): 3–21.

conditions of production; especially in the German context, “net literature” (*Netzliteratur*) was for a long time confusingly used as the generic term for all computer-based and thus also generative literature, even if it had nothing to do with the net. Today, however, the then-novel focus on collaboration is once again central to the discussion of authorship in AI: just as different authors work together in large “Mitschreibeprojekte” (co-writing projects),⁴⁸ the relationship between humans and machines could also be described as cooperative, as “cyborg authorship”.⁴⁹ Current approaches, such as those of the German writer Mattis Kuhn, the Austrian digital poet Jörg Piringer, and myself,⁵⁰ increasingly take up this aspect again, and I will come back to it in the third section.⁵¹

2. Causal Authorship

This – admittedly telegraphic – overview of the discourse on machine authorship shows how NLP and AI research, as well as artistic approaches, articulate quite different interests: while AI research, with its hunt for intelligence or rationality (if not consciousness), continues to at least implicitly presuppose authorship as an *intentional* category, NLP is more interested in the processes of text synthesis, which, depersonalized and as structural property, can be understood as a system of *langue* entirely without *parole*, to speak with Saussure. Artistic experiments can make use of both frameworks and are driven much more by aesthetic and poetological than by technical considerations, so that the discourse of authorship has received a completely different technical basis with the poststructuralist-influenced hypertext literature.

The neglect of the production aspect in the literary theoretical discourse of the 1980s and 1990s, however, overlooked the fact that a fundamental reorientation of AI research took place

⁴⁸ Christiane Heibach, *Literatur im elektronischen Raum* (Frankfurt am Main: Suhrkamp, 2003), 168–171.

⁴⁹ Espen J. Aarseth, *Cybertext: Perspectives on Ergodic Literature* (Baltimore: The Johns Hopkins University Press, 1997), 132–36. For Aarseth, cyborg authorship comes in a variety of types: 1) “pre-processing” means preparing the program, loading it with input, and then let the computer produce the text; 2) “co-processing” means using the computer during producing the text; 3) “post-processing” means selecting computer-produced text. These steps are ideal-types and can occur in various combinations.

⁵⁰ Mattis Kuhn, *Selbstgespräche mit einer KI* (n.p.: 0x0a, 2021); Jörg Piringer, *Datenpoesie* (Klagenfurt: Ritter, 2018); Jörg Piringer, *Günstige Intelligenz* (Klagenfurt: Ritter, 2022); Hannes Bajohr, *Halbzeug: Textverarbeitung* (Berlin: Suhrkamp, 2018); 0x0a, ed., *Poetisch denken*, 4 vols. (n.p.: 0x0a, 2020).

⁵¹ Hannes Bajohr, *Schreibenlassen: Texte zur Literatur im Digitalen* (Berlin: August Verlag, 2022); Leah Henrickson, “Tool vs. Agent: Attributing Agency to Natural Language Generation Systems,” *Digital Creativity* 29, no. 2–3 (2018): 182–90.

during this period, which, with some interruptions and detours, is still influential today. If the focus had been primarily on symbolic AI since the field's inception at the Dartmouth Conference in 1956, the 1980s saw a shift to subsymbolic AI.⁵² The difference is fundamental.

Symbolic AI involves the explicit formulation of rule steps as well as the encoding of world knowledge in so-called expert systems.⁵³ These systems are programmed according to a 'sequential' paradigm in a step-wise fashion, are human-readable in their structure, and their ability to learn is limited to expanding their knowledge base. *Subsymbolic AI*, on the other hand, whose foundations were laid in the 1950s but not revisited until the 1980s,⁵⁴ does not require explicit rules but is based on stochastic machine learning. It can be called the 'connectionist' paradigm, since deep learning primarily involves artificial neural networks (ANNs) that model an input-output function via amplifying and inhibiting the signals of "neuron" structures, that, abstractly, emulate the structure of the brain.⁵⁵

Nevertheless, it took until the 2010s for the connectionist paradigm to be used for literary and artistic purposes. Since then, its power has been demonstrated in comparison to classical text generators based on combinatorics or aleatorics. Moreover, in unsupervised learning – in which the features of language are derived by the machine learning system without any human assistance – the idea of "intelligent" machines is realized much more convincingly, so that they can apply and accumulate knowledge with greater ease. Since current NLP applications such as machine translation are also implemented as ANNs and, moreover, are increasingly referred to as "AI" themselves, the former distance between the two fields has shrunk. "Large language models" such as GPT-4 are now being presented as "foundation models" for more comprehensive AI systems.⁵⁶

The first explicit literary experiments with ANNs probably took place in the early 2000s.⁵⁷

⁵² Melanie Mitchell, *Artificial Intelligence: A Guide for Thinking Humans* (New York: Farrar, Straus, and Giroux, 2019).

⁵³ Ethem Alpaydm, *Machine Learning: Revised and Updated Edition* (Cambridge, Mass: MIT Press, 2021), 60–62.

⁵⁴ The breakthrough came with David E. Rumelhart, James L. McClelland, and PDP Research Group, *Parallel Distributed Processing: Explorations in the Microstructure of Cognition, Foundations*, vol. 1 (Cambridge, Mass.: MIT Press, 1986); see Nilsson, *The Quest for Artificial Intelligence*, 339–40.

⁵⁵ Alpaydm, *Machine Learning*, 105–42; on the difference between sequential/connectionist, see Hannes Bajohr, "Algorithmic Empathy: Toward a Critique of Aesthetic AI," *Configurations* 30, no. 2 (2022): 203–31.

⁵⁶ Rishi Bommasani et al., "On the Opportunities and Risks of Foundation Models," *arXiv*, 2021, <http://arxiv.org/abs/2108.07258>.

⁵⁷ Funkhouser reports of a 2006 project to generate Rumi verses, Funkhouser, *New Directions in Digital Poetry*, 306–7.

However, it was the popularization of an AI architecture called LSTM-RNNs (long short-term memory recurrent neural networks) around 2015 – although they had been known since the 1990s – that spawned the broad field of literary experiments that continues to flourish today. As the quality of the output (in terms of approximating natural language) has improved – the currently most successful architecture is the Transformer⁵⁸ – the question of the authorship of such systems has come back into focus. Significantly, the technical substructure has a direct impact on the possible loci of authorship. It makes a difference whether writing is sequential or connectionist, as the chain of operations and technical apparatuses between the authoring human and the final text change when moving from one to the other.

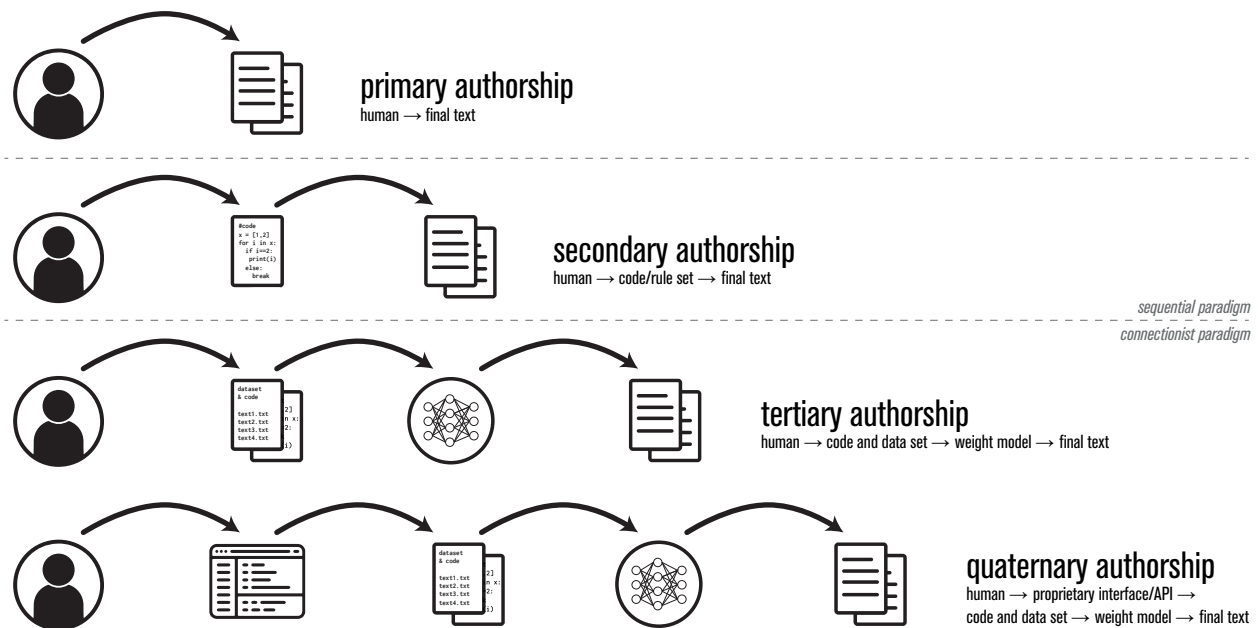


Figure 1: Four degrees of causal authorship measuring the “distance” between human author and final text.

To describe these different configurations, I propose the concept of *causal authorship* (fig. 1). Before a specifically literary author function is concerned, we must first be clear about who does what by which means at which point of the process of text production. Looking in this way at the production side of generative writing, causal authorship constructs *degrees of distance* between the human author and resultant text. This model is willfully reductionist – it assumes a single

⁵⁸ Ashish Vaswani et al., “Attention Is All You Need,” *Advances in Neural Information Processing Systems* 2017- Decem, no. Nips (June 12, 2017): 5999–6009; for a comprehensive introduction to the Transformer architecture as it is used in ChatGPT, see Stephen Wolfram, “What Is ChatGPT Doing ... and Why Does It Work?,” *Stephen Wolfram Writings*, February 14, 2023, <https://writings.stephenwolfram.com/2023/02/what-is-chatgpt-doing-and-why-does-it-work>.

author, only looks at the process of text generation (rather than, say, brainstorming prior to writing), ignores the historical changes in the concept of authorship, and it focuses solely on the reception side – but in its constructedness shows how the writing configuration fundamentally changes with new technologies.

Primary authorship would be the still valid standard of conventional, “immediate” writing, in which an author more or less directly puts text on paper or onto a data carrier. The entities that stand between the writer and the text may be technical in nature – from quill to typewriter to word processor – and may have some effect on the output, as media studies has repeatedly pointed out, but their determinative influence does not diminish the connection between author and text that is perceived as causally unbroken.⁵⁹ The act of writing is localized entirely or predominantly on the side of the person operating the apparatus of writing, and all other actors involved are merely passively mediated, or have a maybe measurable but in the end non-decisive impact on the author. That this model is by no means valid for all forms of writing can be seen by turning to the additional degrees of distance that rupture this unbroken connection and insert a gap in its relative immediacy.

Secondary authorship would thus be a first-order distance that duplicates the act of writing. Strictly speaking, it appears in all rule-based poetry, be it the combinatorial poetry experiments of the Baroque or those of the historical avant-gardes.⁶⁰ It is also the model of authorship at work in the sequential paradigm: the author’s contribution in these cases is to formulate a sequence of rules, the execution of which produces the work. The act that established this rule sequence is, on a causal level, indistinguishable from primary authorship, but the resulting text has a vicarious function, being merely the first module in a chain of operations that outputs the final text. Authorship here means writing a text that writes a text.

This model includes all of the types of classic digital literature mentioned above, such as

⁵⁹ Matthew G. Kirschenbaum, *Track Changes: A Literary History of Word Processing* (Cambridge, Mass.: Belknap Press, 2016); Martin Stingelin, “UNSER SCHREIBZEUG ARBEITET MIT AN UNSEREN GEDANKEN: Die poetologische Reflexion der Schreibwerkzeuge bei Georg Christoph Lichtenberg und Friedrich Nietzsche,” in *Schreiben als Kulturtechnik: Grundlagentexte*, ed. Sandro Zanetti (Berlin: Suhrkamp, 2012), 83–104. My point here is that repeating the truism of media studies and “Schreibszenenforschung” that “Our writing tools are also working on our thoughts” – and thus declaring writing with large language models essentially the same as writing with a typewriter – obscures what is genuinely new about writing with AI.

⁶⁰ Florian Cramer, *Exe.cut[up]able statements: Poetische Kalküle und Phantasmen des selbstaufführenden Texts* (München: Fink, 2011); for an overview of generative and combinatory techniques, see Scott Rettberg, *Electronic Literature* (London: Polity, 2019), chap. 2.

Strachey’s “Love Letters” (though hypertext is subject to certain limitations), as well as the transformation rules of symbolic AI, as in ELIZA. Unlike historical rule-based poetry, however, the text of the *code* is itself operative – it has its own causality and performativity as it effectively brings about the output. It is this performative relationship that raises the question of a possible computer authorship in the first place, which is hardly an issue in “analog” rule-based writing.

However, it is not always necessary that the operative text be human-made; it may itself be the product of an earlier production step. The machine learning process of the connectionist paradigm inserts a second hiatus into the chain of operations, and brings forth *tertiary authorship*. Computer scientist François Chollet has described the essential difference between the sequential and the connectionists paradigms as follows: if the former can be described as “rules + data = answers,” the latter follows the scheme “data + answers = rules.”⁶¹ Thus, rules are no longer written in a program script whose application (to data) produces an output, but rather an ANN is trained on a large set of exemplary outputs that makes the “rules” that eventually lead to the final text. The exact model architecture is not important for determining the degree of distance; the principle is the same for LSTM-RNNs or the Transformer: it is up to the author to program the learning algorithm (which is, however, usually done by third parties), to define the training dataset (from which the ANN builds the model on its own), and to determine the parameters (by which the model finally produces the output). The text that writes the output in the secondary model is thus itself computer-made.

Nevertheless, even in the tertiary model, authorship is still located, as it were, in the engine room of the digital: the choice of the training algorithm and the “hyperparameters” – settings such as the learning rate of the model or the randomness (“temperature”) of the output – as well as the curation of the training dataset, are still subject to the user’s control and choice. With the advent of large language models such as GPT-3, ChatGPT, or Bard,⁶² this may not always be the case. One can now plausibly speak of *quaternary authorship*. Since large language models are predominantly proprietary software – which is still in most cases too large to be trained from scratch by individual users – consumers are more often than not limited to

⁶¹ François Chollet, *Deep Learning with Python*, 2nd ed. (Shelter Island: Manning Publications, 2021), 4.

⁶² Tom B. Brown et al., “Language Models Are Few-Shot Learners,” *arXiv*, May 28, 2020, <http://arxiv.org/abs/2005.14165>; OpenAI, “GPT-4 Technical Report,” 2023, doi:10.48550/ARXIV.2303.08774; James Manyika, “An Overview of Bard: An Early Experiment with Generative AI,” 2023, <https://ai.google/static/documents/google-about-bard.pdf>.

the “factory settings” and cannot choose their own dataset.⁶³ What is more, the only way to interact with these models is through their graphical interface or their API via natural language prompts. Thus, instead of writing the code that writes a poem, or training a language model on a large number of poems and having it output new ones, in the quaternary model, it is solely the input that counts and that is still under human control: “Write a poem in the style of Wallace Stevens.”⁶⁴ “Promptology” – the efficient, even virtuosic formulation of such input prompts – is the main mode of operation of quaternary authorship. But because it can only operate within a given system, it also means: *Il n’y a rien hors du modèle* – there is no outside-model. Authorship is encapsulated in the iron cage of a commercial language technology whose precise workings are unfathomable to the outside user.⁶⁵

These degrees of causal authorship are ideal types, intended to bring some structure to what so far has been a rather unstructured debate about AI authorship. They are, therefore, not exhaustive, nor are they meant to indicate any kind of teleology or progression from low to high. In particular, the latter two are in practice simply a choice between using the “factory settings” or not – regardless of whether fine-tuning via one’s own dataset is possible, as with the current GPT-3 model, or not, as with Bard or ChatGPT. K Allado-McDowell’s *Pharmako-AI*, which the author wrote using the standard GPT-3 setting, would thus be quaternary writing; training an AI model on a specific corpus, as I do for my novel (*Berlin, Miami*), would be tertiary writing.⁶⁶ The ordinal numbering does not declare one type of writing to be more advanced than the other, only that the distance from the author to the final text, and thus the operative choices open to the human author, differ between them.

⁶³ With LLaMA and Alpaca, open-source language models are available that indeed can be finetuned, even on a local computer. But while this means that state-of-the-art language models *can* be finetuned, it will most likely not do away with the widespread use of the “factory settings,” if only because convenience has always been a factor in tool use.

⁶⁴ Brown et al., “Language Models Are Few-Shot Learners,” 48–49.

⁶⁵ The economic aspect of language models in particular and AI technology in general cannot be considered further at this point, but I want to note that there is ample literature on the subject: Dieuwertje Luitse and Wiebke Denkena, “The Great Transformer: Examining the Role of Large Language Models in the Political Economy of Ai,” *Big Data & Society* 8, no. 2 (2021): 205395172110477; Kate Crawford, *Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence* (New Haven: Yale University Press, 2021). That “ordinary” text processors, too, are entangled in economic structures is a point made by Till A. Heilmann, *Textverarbeitung: Eine Mediengeschichte des Computers als Schreibmaschine* (Bielefeld: Transcript, 2012) and Kirschenbaum, *Track Changes*.

⁶⁶ K Allado-McDowell, *Pharmako-AI* (London: Ignota, 2020); Hannes Bajohr, (*Berlin, Miami*) (Berlin: Rohstoff, 2023). For the latter, I was still able to determine the training set, unlike in the case of Allado-McDowell. I finetuned the open-source GPT-J and GPT-NeoX models on four contemporary German novels to derive a similar tone and subject matter to the input.

3. *Distributed Authorship*

Causal authorship, which focuses on the human component in human-machine interactions and measures its distance from the final text, is a necessary first step toward more complex descriptive models of authorship in the age of large language models. Identifying all the technical processes involved is a prerequisite for moving on to more advanced conceptualizations. Of the many limitations of this model, I want to consider two now: first, it seems already decided here that computers cannot be authors themselves, but are only cogs in a larger machinery of writing that is under the control of a human, however distant he or she may be. And second, it is still a single author who is ultimately responsible for the resulting text, and not a whole network of actors, be they human or non-human.

To begin with, it is not so certain that the human is always in the driver's seat when writing a text. Since primary authorship has so far served as a foil for "immediate" writing, the increasing distance seems to be accompanied by an increasing loss of control: while the production rules of secondary authorship in the sequential paradigm could still be formulated precisely and deterministically, the machine learning approach of the connectionist paradigm that governs tertiary and quaternary authorship operates via a stochastic process that results in a probability distribution over text sequences. If the former can easily produce any number of identical outputs, the latter is designed to reproduce statistically similar, but not identical outputs; instead of slot-and-fill templates, it outputs "Gestalten."⁶⁷

In addition, neural language models are largely opaque. While the code that characterizes secondary authorship is written by humans and can therefore also be read by them, the "weight model" of the ANN – which encodes the connections strengths between its simulated neurons – is, as the result of a statistical process, in principle not translatable back into human-readable rule-steps of code.⁶⁸ In Diltheyian terms, the ANN is not straightforwardly an artifact of human

⁶⁷ Hannes Bajohr, "The Gestalt of AI: Beyond the Atomism-Holism Divide," *Interface Critique* 3 (2021): 13–35. It is important to note that of course neural networks still run on digital systems and are thus only conceptually, but not computationally, distinct from older types of computation. Likewise, neural nets *can* produce identical output if their "temperature" (their induced randomness) were reduced to zero; but this would go against their intended design.

⁶⁸ Fabian Offert, "Can We Read Neural Networks? Epistemic Implications of Two Historical Computer Science Papers," *American Literature* 95, no. 2 (2023): 423–28.

cultural production to be *understood*, but rather akin to a natural object to be *explained* – a star cluster rather than a manuscript variant.⁶⁹

Both the loss of control and the increasing opacity of language models raise the possibility of autonomous AI authorship – not the human but the machine itself would be the author here. The essential axis, then, is that of the *agency* of the system, which ranges from mere tool to autonomous agent: is AI itself an author in the end or just a better typewriter?⁷⁰

As shown in the first section, classical computer science, as well as the bulk of digital literature, resists attributing authorship to the computer. Weizenbaum, for instance, still held in 2001: “The programmer has chosen the rules according to which the computer writes. Whether now the programmer deserves praise because he has chosen just these editing rules, I don’t know. ... In any case, he should not say that the computer writes poetry.”⁷¹ But there have always been counter-arguments. Already Turing had considered Weizenbaum’s point under the title of “Lady Lovelace’s objection.”⁷²

He was alluding to Ada Lovelace, who developed the “programming language” for Charles Babbage’s mechanical calculating machine and who can thus be considered the first coder. In a commentary on the design of Babbage’s analytical engine, she speculated that the machine could not, in principle, produce anything new because all of its products could be traced back to the instructions of a human programmer.⁷³ Turing, on the other hand, held that even rule-based programs could produce surprise because human anticipation is limited in the face of complex code-output relationships.⁷⁴ Moreover, the possibility of *learning* machines would render Lovelace’s objection moot: if a machine were capable of dynamically adopting new behavior on the basis of invariant rules, it would have to appear unpredictable, downright random, even to its builders.⁷⁵

⁶⁹ Leah Henrickson and Albert Meroño-Peñuela, “The Hermeneutics of Computer-Generated Texts,” *Configurations* 30, no. 2 (2022): 115–39.

⁷⁰ Henrickson, “Tool vs. Agent.”

⁷¹ Joseph Weizenbaum, “Kunst und Computer,” in *Computermacht und Gesellschaft: Freie Reden*, ed. Gunna Wendt and Franz Klug (Frankfurt am Main: Suhrkamp, 2001), 103.

⁷² Turing, “Computing Machinery and Intelligence,” 450–51.

⁷³ Ada Lovelace, “Translator’s Notes to M. Menebrea’s Memoir,” in *Babbage’s Calculating Engines: Being a Collection of Papers Relating to Them; Their History, and Construction*, ed. Henry P. Babbage (Cambridge: Cambridge University Press, 2010), 44.

⁷⁴ “Esprit der Regel”, Hannes Bajohr, “Vom Geist und den Maschinen: Autorschaft zwischen Mensch und Computer,” in *Schreibenlassen*, 37.

⁷⁵ Turing, “Computing Machinery and Intelligence,” 459.

Since modern ANNs implement a variant of such “learning,” Turing’s reply seems more plausible today than it did in the days of the sequential paradigm. Such a stance would reduce human authorship to the act of curating the output, which plays a role in all writing – at the very least in the speech act of the “imprimatur.” In the context of automated processes, one might locate it in the feedback process in which the programmer changes a code’s parameters based on the output produced. The less control that remains, the greater the role of editorial choice, one might say. It is therefore plausible to think of authorship as *editorship*, as was already suggested during the heyday of hypertext literature.⁷⁶

Going further, literary scholars have for a long time argued that the figure of the author may not be the most important thing when discussing a text. Rather, the meaning-making part of engaging with texts is the act of *reading*, not the act of writing. There is little difference between intentionally written and non-intentionally generated texts, after all, if claims to meaning can only be plausibly made on the side of the receiver, and this is true for AI writing as well.⁷⁷ The role of the reader, the *lector in fabula*, would then deprivilege the author to such a degree that the actual production techniques of synthetic writing would become utterly unimportant. Such a blunt transfer of the discourse of authorial death to AI-generated texts would, however, diminish the possible contribution of literary studies.

For apart from the *lector in fabula* or reader-response criticism, a number of classical concepts could find a second use in the discussion of AI authorship, if they are sensibly updated. Julia Kristeva’s notion of “intertextuality,” for example, would not only make sense as the “mosaic of citations”⁷⁸ of texts produced via primary authorship, but would invite its application to the medial situation of secondary, tertiary, and quaternary writing. Since the intertext here is quite literally present in the dataset – though not as an atomistic mosaic but as a holistic statistical distribution⁷⁹ – we are dealing with a *multiplication* of authorship relations.

Apart from the fact that programming languages themselves have authors, the very fabric of code is intertextually authored, since its functionality is highly recurrent and programmers

⁷⁶ Uwe Wirth, “Der Tod des Autors als Geburt des Editors,” *Text+Kritik*, no. 152 (2001): 54–64.

⁷⁷ Matthew G. Kirschenbaum, “Spec Acts: Reading Form in Recurrent Neural Networks,” *ELH* 88, no. 2 (2021): 361–86; Stephanie Catani, “Erzählmodus an?: Literatur und Autorschaft im Zeitalter künstlicher Intelligenz,” in *Jahrbuch der deutschen Schillergesellschaft*, vol. 64 (Berlin: de Gruyter, 2020), 304.

⁷⁸ Julia Kristeva, *Séméiotikè: Recherches pour une sémanalyse* (Paris: Seuil, 1969), 85.

⁷⁹ This distinction lies, I believe, at the heart of old and new AI technology, see Bajohr, “The Gestalt of AI.”

reuse both their own and others' code snippets. This can happen via repositories like GitHub or forums like Stackoverflow, where either entire libraries of functions can be downloaded and plugged into own's own code in a modular fashion, or where code sequences are collectively corrected or improved on a micro level.⁸⁰ It is not uncommon here for authorship to be deliberately omitted. Mark Marino compares such code snippets to the use of a screw in mechanical engineering – an engineer would not cite its inventor every time the screw is used.⁸¹ The idea of *collective* authorship, which dominated research on net literature in the 1990s,⁸² is therefore also applicable to executable primary text, that is, program codes.

While this still refers to the interaction of human authors, science and technology studies go further and also include non-human actors in the writing collective, arguing for what one can call *distributed authorship*. Katherine Hayles, for example, explicitly assumes “multiple authorships” on the part of the computer's hardware⁸³ and suggests that calculating machines themselves can be thought of as “cognizers.”⁸⁴ This stance is articulated primarily in the context of actor-network theory, which understands agency precisely not as “limited a priori to what ‘intentional,’ ‘meaningful’ humans do,”⁸⁵ but as distributed across an assemblage of actors in complex chains of operations. Instead of thinking of authors as solely human, in an ANT-inspired theory of authorship they would become a process and “the empirical person [would be] just one human actor in an actor-network called ‘author’.”⁸⁶

⁸⁰ Karl Wolfgang Flender, “Do Conceptualists Dream of Electric Sheep? Algorithmische Interpretation des Unbewussten in Conceptual Writing und konzeptueller Codeliteratur,” in *Digitale Literatur II*, 139.

⁸¹ Mark C. Marino, *Critical Code Studies* (Cambridge, Mass.: MIT Press, 2020), 50.)

⁸² Heibach, *Literatur im elektronischen Raum*, 205–6.

⁸³ N. Katherine Hayles, *My Mother Was a Computer* (Chicago: The University of Chicago Press, 2005), 105.

⁸⁴ N. Katherine Hayles, “Can Computers Create Meanings? A Cyber/Bio/Semiotic Perspective,” *Critical Inquiry* 46, no. 1 (September 2019): 32–55. For an alternative view, see Hannes Bajohr, “Dumb Meaning: Machine Learning and Artificial Semantics,” *IMAGE* 37, no. 1 (2023): 58–70..

⁸⁵ Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory*, Clarendon Lectures in Management Studies (Oxford: Oxford University Press, 2005), 81.

⁸⁶ Jens Schröter, “Autorschaft aus dem Blickwinkel der Akteur-Netzwerk-Theorie,” in *Grundthemen der Literaturwissenschaft: Autorschaft*, ed. Michael Wetzler (Berlin: De Gruyter, 2022), 626.

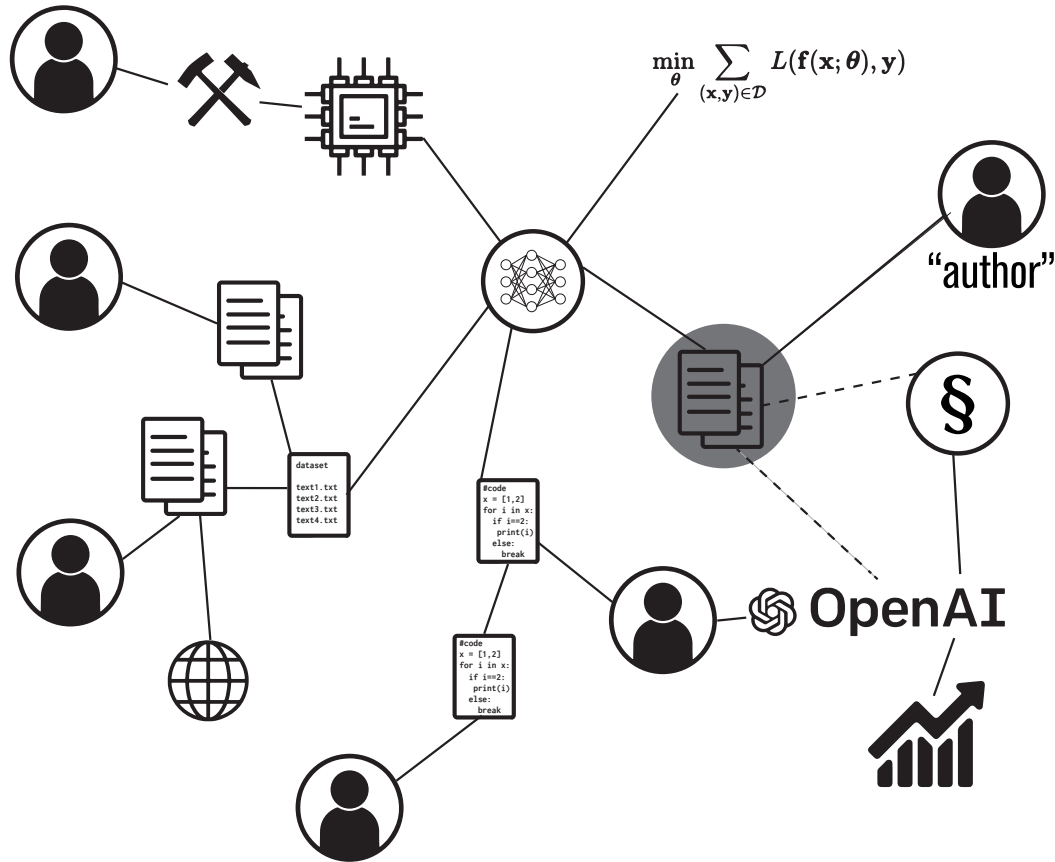


Figure 2: Distributed authorship including the situated intertext, material resources, labor, and economic and legal relations.

This actor-network must be imagined as sprawling and immense. It would include not only the human author, now severely sidelined, and the intertext, now localized in the training set. Nor would it stop at the labor of those who wrote the training data or with the programmers responsible for the algorithms involved – either abstractly, as theorems (fig. 2 shows the formula for empirical risk minimization, a principle in statistical learning theory), or concretely, as code – as the “screws” in Marino’s metaphor. Moreover, the companies behind large language models (be they OpenAI, as fig. 2 suggests, or any other future major player), with their integration into the market and their extractive as well as normative impact on writers everywhere, are as much part of this network as the legal framework, which is still in the process of catching up with the realities of modern text AI.⁸⁷ Finally, the network would even include all the matter involved: the machines that run the code as well as the minerals and rare earths they

⁸⁷ A much more exhaustive and impressive visualization of the actor-network of AI systems – not under the auspices of authorship but using Amazon’s Echo as an example – give Kate Crawford and Vladan Joler, “Anatomy of an AI System,” 2018, <http://www.anatomyof.ai>.

are made of, which are extracted from the soil in a process that emits CO₂, a direct factor in climate change. From this vantage point, the Earth itself would lay claim to be a participant in the authorship network.⁸⁸

So conceived, distributed authorship as actor-network would be potentially infinite. Drawing the line between what still is and what is no longer part of it would be a pragmatic decision based on the questions one wants to ask of the network. And as relevant as distributed authorship is for checking the anthropocentric and falsely teleological tendencies of causal authorship, it is not without its problems either. Oddly enough, it is its very omnivorousness that may blur what is contained in its network. Large language models are a case in point: systems like ChatGPT derive their power from the size of the training data on which they are based, which now encompasses more or less the entire Internet. Thus, as these systems incorporate the language of the commons, “distributed authorship” would take on a new meaning that is more reminiscent of a collective unconscious as a source of “automatic” writing.⁸⁹

Jasmin Meerhoff points out that there are drawbacks to such metaphors of collectivity, for the “maximally distributed, dispersed, or completely atomized authorship” implied here may mention economic dependencies but sublates them into a collective whole that can no longer be addressed as an ethically responsible agent.⁹⁰ Here, it is advisable to avoid talk of a *machine* agency and instead acknowledge the actual *human* authors behind the AI output: as laborers, but also as bearers of identities.⁹¹ This call echoes considerations from the sociology of art, which emphasize the infrastructural “support personnel” that operate behind the seemingly autonomous entities of the art system and make its activities possible in the first place.⁹² Here, the overly personalizing causal authorship can in turn be a check on the overly collectivizing

⁸⁸ See Crawford, *Atlas of AI*; Emily M. Bender et al., “On the Dangers of Stochastic Parrots: Can Language Models Be Too Big?,” in *FAccT '21: Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency* (Association for Computing Machinery, 2021), 610–23.

⁸⁹ Meghan O’Gieblyn, “Babel: Could a Machine Have an Unconscious?,” *N+1* 40, no. 1 (2021), <https://www.nplusonemag.com/issue-40/essays/babel-4>; Slavoj Žižek, “ChatGPT Says What Our Unconscious Radically Represses,” *Sublation Magazine*, April 7, 2023, <https://www.sublationmag.com/post/chatgpt-says-what-our-unconscious-radically-represses>.

⁹⁰ Meerhoff, “Verteilung und Zerstäubung,” 55.

⁹¹ This case is also made from the perspective of a practitioner of electronic literature by Jörg Piringer, “Elektrobarden,” *Transistor* 1, no. 2 (2019): 21.

⁹² Howard S. Becker, *Art Worlds* (Berkeley: University of California Press, 1982), x; Annette Gilbert, “Kollaterales Schreiben: Digitale Kollaboration im Zeitalter von Crowdworking und Algotaylorismus,” in *Digitale Literatur II*, 66.

distributed authorship. Perhaps it is best to think of both as two countervailing forces that together constitute the field of tension that is authorship in the age of machine learning.

4. Conclusion

Looking at the limited *literary* experiments conducted with AI to date, one would expect to see an emphasis either on the collectivity of the commons of language, or on the collaboration with the machine, both of which would suggest an increasing dissolution of the author function. With a few exceptions,⁹³ however, authors seem to continue to attach their names to works produced in collaboration with AI systems. Even a book like *Amor Cringe* by the American poet K Allado-McDowell appears under the name of the human actor of its author network,⁹⁴ even though it was explicitly written in cooperation with GPT-3.

Clinging to the name of the author, however, does not necessarily imply a reactionary reactivation of outdated ideas of genius or a plea for the total aesthetic autonomy of the artist. For the poet Allison Parrish, understanding computers as tools is less an ontological question than a political task: “It will always be a mistake to attribute volition to the computer and not to the people who programmed it because attribution of volition is removing personal responsibility: the algorithm did it, not me.”⁹⁵ Reclaiming authorship can be brought into play precisely as a *defense* against both the phantasm of the technically optimized AI genius and the absolute atomization of authorship, which no longer has a place for political, economic, and ethical responsibility. Instead of collaboration, clearly hierarchized *co-creation* is preferred here.⁹⁶

As mentioned above, the claim to a truly strong AI authorship – capable of autonomous creations beyond collaboration, co-creation, and distribution – is found primarily in the tech industry, whose representatives understand art as a benchmark or a catalyst for the development

⁹³ See the examples in Manuel Kaufmann, *Dreaming Data: Aspekte der Originalität und Autorschaft in der künstlichen Kreativität* (Zürich: Chronos, 2022).

⁹⁴ K Allado-McDowell, *Amor Cringe* (New York: Deluge, 2022).

⁹⁵ Quoted in Miller, *The Artist in the Machine: The World of AI-Powered Creativity*, 223.

⁹⁶ David Jhave Johnston, *ReRites: Human + A.I. Poetry. Raw Output*, 2019; see also Kaufmann, *Dreaming Data*, 38.

of an artificial consciousness.⁹⁷ Here, ideas of authorship as genius survive much more unquestioned than in the fields of art and literature, which have been busy deconstructing such grand concepts for more than sixty years. But it is also clear that the notion of the Romantic author need not be human; it is malleable enough that the idea of absolute originality, creating something novel out of thin air, can certainly be applied to AI models, as Carys J. Craig and Ian R. Kerr show in their legal discussion of AI copyright.⁹⁸ And so it is not in the literary engagement with language models, but in the Valley, that the basic ideology of AI research seems to live on, conflating questions of consciousness and intelligence with intentional authorship. Literature, it appears, continues to pursue the model of NLP – the deliberate generation of text that may or may not be used, claimed, and repurposed by a human author who attaches his or her name to the final product.

Finally, the more we are surrounded by AI-generated writing – what Matthew Kirschenbaum has called the “textpocalypse”⁹⁹ – the less purchase we may, in the long run, give to the idea of “artificial authors.” As much as the decentering of distributed authorship requires a recentering via causal authorship, and vice versa, then, it is also possible that the concept of authorship as such will apply to fewer and fewer *kinds* of texts. This can be thought of as similar to the authorless situation that Foucault speculated about: “One can imagine a culture where discourses would circulate and be received without the author-function ever appearing.”¹⁰⁰ This is already partly a reality in our culture: in the case of automated information systems, interfaces, and other machine communications to which we are exposed on a daily basis, the question of authorship does not arise at all – one would not infer from the display on an ATM that the machine is a person, nor would one essentially agonize over the original author of its messages.¹⁰¹ The more machine-generated text proliferates, the more likely it is to be regarded as neither natural nor artificial in Bense’s sense, but as what I have elsewhere called “post-artificial”

⁹⁷ See Daub, *What Tech Calls Thinking*; as an example, see Marian Mazzone and Ahmed Elgammal, “Art, Creativity, and the Potential of Artificial Intelligence,” *Arts* 8, no. 1 (February 21, 2019).

⁹⁸ Carys J. Craig and Ian R. Kerr, “The Death of the AI Author,” *Ottawa Law Review* 52, no. 1 (2019): 31–86.

⁹⁹ Matthew Kirschenbaum, “Prepare for the Textpocalypse,” *The Atlantic*, March 8, 2023, <https://www.theatlantic.com/technology/archive/2023/03/ai-chatgpt-writing-language-models/673318/>.

¹⁰⁰ Michel Foucault, “Qu’est-ce qu’un auteur?,” in *Dits et écrits: 1954-1988*, ed. Daniel Defert, François Ewald, and Jacques Lagrange (Paris: Editions Gallimard, 1994), 811. My translation. This passage does not appear in the American edition of the text.

¹⁰¹ Elena Esposito, *Artificial Communication: How Algorithms Produce Social Intelligence* (Cambridge, Massachusetts: The MIT Press, 2022).

– as essentially authorless, so that only its content remains to be examined, not its personal origin to be investigated.¹⁰² Of course, this may apply to more certain genres than others, and perhaps not at all to some. But at least as a heuristic concept, post-artificiality is a useful boundary for what might be possible in the age of machine-generated texts. The question of authorship, in a late victory for Barthes, Foucault and others, would in such a case truly be lost in the “anonymity of a murmur.”¹⁰³

Bibliography

0x0a, ed. *Poetisch Denken*. 4 vols. n.p.: 0x0a, 2020.

Aarseth, Espen J. *Cybertext: Perspectives on Ergodic Literature*. Baltimore: The Johns Hopkins University Press, 1997.

Adrian, Marc. *Die Maschinentexte: Montagen, Textsynthesen, Computergenerierte Texte und Permutationen. Sammlung 1966-1992*. Edited by Gerald Ganglbauer. Stattegg: Gangan, 2020.

— — —. *Inventionen*. Linz: edition neue texte, 1980.

Allado-McDowell, K. *Amor Cringe*. New York: Deluge, 2022.

— — —. *Pharmako-AI*. London: Ignota, 2020.

Alpaydin, Ethem. *Machine Learning: Revised and Updated Edition*. Cambridge, Mass: MIT Press, 2021.

Bajohr, Hannes. “Algorithmic Empathy: Toward a Critique of Aesthetic AI.” *Configurations* 30, no. 2 (2022): 203–31.

— — —. “Artifizielle und postartifizielle Texte: Über die Auswirkungen Künstlicher Intelligenz auf die Erwartungen an literarisches und nichtliterarisches Schreiben.” *Sprache im technischen Zeitalter* 243, no. 1 (2023): 37–61.

— — —. (*Berlin, Miami*). Berlin: Rohstoff, 2023.

— — —. *Halbzeug: Textverarbeitung*. Berlin: Suhrkamp, 2018.

— — —. *Schreibenlassen: Texte zur Literatur im Digitalen*. Berlin: August Verlag, 2022.

— — —. “The Gestalt of AI: Beyond the Atomism-Holism Divide.” *Interface Critique* 3 (2021): 13–35.

¹⁰² For more on this concept, see Hannes Bajohr, “Artifizielle und postartifizielle Texte: Über die Auswirkungen Künstlicher Intelligenz auf die Erwartungen an literarisches und nichtliterarisches Schreiben,” *Sprache im technischen Zeitalter* 243, no. 1 (2023): 37–61.

¹⁰³ Foucault, “What Is an Author?,” 222.

- — —. “The Paradox of Anthroponormative Restriction: Artistic Artificial Intelligence and Literary Writing.” *CounterText* 8, no. 2 (August 2022): 262–82.
- — —. “Vom Geist und den Maschinen: Autorschaft zwischen Mensch und Computer.” In *Schreibenlassen: Texte zur Literatur im Digitalen*, 33–38. Berlin: August Verlag, 2022.
- Barthes, Roland. “The Death of the Author.” In *Image, Music, Text: Essays*, translated by Stephen Heath, 13. [Dr.], 142–48. London: Fontana, 1977.
- Becker, Howard S. *Art Worlds*. Berkeley: University of California Press, 1982.
- Bender, Emily M., Timnit Gebru, Angelina McMillan-Major, and Shmargaret Shmitchell. “On the Dangers of Stochastic Parrots: Can Language Models Be Too Big?” In *FACCT ’21: Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency*, 610–23. Association for Computing Machinery, 2021.
- Bense, Max. *Ästhetik und Texttheorie*. Edited by Elisabeth Walther. *Ausgewählte Schriften*. Vol. 3. Stuttgart: Metzler, 1998.
- — —. “Über natürliche und künstliche Poesie.” In *Theorie der Texte. Eine Einführung in neuere Auffassungen und Methoden*, 143–47. Köln: Kiepenheuer & Witsch, 1962.
- Bernhart, Toni. “Beiwerk als Werk: Stochastische Texte von Theo Lutz.” *editio*, no. 34 (2020): 180–206.
- Bolter, Jay David. “Artificial Intelligence.” In *Writing Space. The Computer, Hypertext, and the History of Writing*, 171–93. Hillsdale, NJ: Erlbaum, 1991.
- Bommasani, Rishi, Drew A. Hudson, Ehsan Adeli, Russ Altman, Simran Arora, Sydney von Arx, Michael S. Bernstein, et al. “On the Opportunities and Risks of Foundation Models.” *arXiv*, 2021. <http://arxiv.org/abs/2108.07258>.
- Borges, Jorge Luis. “The Garden of Forking Paths.” In *Ficciones*, edited by Anthony Kerrigan, translated by Helen Temple and Ruthven Todd, 89–101. New York: Grove Press, 1962.
- Brown, Tom B., Benjamin Mann, Nick Ryder, Melanie Subbiah, Jared Kaplan, Prafulla Dhariwal, Arvind Neelakantan, et al. “Language Models Are Few-Shot Learners.” *arXiv*, May 28, 2020. <http://arxiv.org/abs/2005.14165>.
- Burke, Seán. *The Death and Return of the Author: Criticism and Subjectivity in Barthes, Foucault and Derrida*. Edinburgh University Press, 2008.
- Calvino, Italo. “Cybernetics and Ghosts.” In *The Uses of Literature*, translated by Patrick Creagh, 3–27. San Diego: Harcourt Brace Jovanovich, 1986.
- Catani, Stephanie. “‘Erzählmodus an’: Literatur und Autorschaft im Zeitalter künstlicher Intelligenz.” In *Jahrbuch der deutschen Schillergesellschaft*, 64:287–310. Berlin: de Gruyter, 2020.
- Chollet, François. *Deep Learning with Python*. 2nd ed. Shelter Island: Manning Publications, 2021.
- Coover, Robert. “Goldene Zeitalter: Vergangenheit und Zukunft des literarischen Wortes in den digitalen Medien.” *Text+Kritik*, no. 152 (2001): 22–30.

- Craig, Carys J., and Ian R. Kerr. "The Death of the AI Author." *Ottawa Law Review* 52, no. 1 (2019): 31–86.
- Cramer, Florian. *Execut[up]able statements: Poetische Kalküle und Phantasmen des selbstausführenden Texts*. München: Fink, 2011.
- Crawford, Kate. *Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence*. New Haven: Yale University Press, 2021.
- Crawford, Kate and Vladan Joler. "Anatomy of an AI System." *Anatomy of an AI System*, 2018. <http://www.anatomyof.ai>.
- Czernin, Franz Josef, and Ferdinand Schmatz. "Notes about the Poetry Program POE." *Ars Electronica Archive*, 1990. https://webarchive.ars.electronica.art/en/archives/festival_archive/festival_catalogs/festival_artikel.asp%3FiProjectID=8950.html.
- Daub, Adrian. *What Tech Calls Thinking: An Inquiry into the Intellectual Bedrock of Silicon Valley*. New York: Farrar, Straus, and Giroux, 2020.
- Deleuze, Gilles, and Félix Guattari. *A Thousand Plateaus*. Translated by Brian Massumi. Minneapolis: University of Minnesota Press, 1987.
- Enzensberger, Hans Magnus. *Einladung zu einem Poesie-Automaten*. Frankfurt am Main: Suhrkamp, 2000.
- Esposito, Elena. *Artificial Communication: How Algorithms Produce Social Intelligence*. Cambridge, Massachusetts: The MIT Press, 2022.
- Flender, Karl Wolfgang. "Do Conceptualists Dream of Electric Sheep? Algorithmische Interpretation des Unbewussten in Conceptual Writing und konzeptueller Codeliteratur." In *Digitale Literatur II*, edited by Hannes Bajohr and Annette Gilbert, 134–44. München: edition text+kritik, 2021.
- Foucault, Michel. "Qu'est-ce qu'un auteur?" In *Dits et écrits: 1954-1988*, edited by Daniel Defert, François Ewald, and Jacques Lagrange, 789–821. Paris: Editions Gallimard, 1994.
- . "What Is an Author?" In *Aesthetics, Method, and Epistemology*, edited by James D. Faubion, 205–22. New York: New Press, 1998.
- Funkhouser, Christopher T. *New Directions in Digital Poetry*. New York: Continuum, 2012.
- Gilbert, Annette. "Kollaterales Schreiben: Digitale Kollaboration im Zeitalter von Crowdfunding und Algotaylorismus." In *Digitale Literatur II*, edited by Hannes Bajohr and Annette Gilbert, 62–74. München: edition text+kritik, 2021.
- "Google Artists and Machine Intelligence." Accessed March 18, 2023. <http://ami.withgoogle.com>.
- Gordin, Michael D. *Scientific Babel: How Science Was Done Before and After Global English*. University of Chicago Press, 2015. <http://www.bibliovault.org/BV.landing.epl?ISBN=9780226000299>.

- Guertin, Carolyn. "Wanderlust: The Kinesthetic Browser in Cyberfeminist Space." *Extensions. Online Journal of Embodiment and Technology*, no. 3 (2007).
<https://web.archive.org/web/20150921150355/http://www.performancestudies.ucla.edu/extensionsjournal/guertin.htm>.
- Hartling, Florian. *Der Digitale Autor: Autorschaft im Zeitalter des Internets*. Bielefeld: Transcript, 2009.
- Hayles, N. Katherine. "Can Computers Create Meanings? A Cyber/Bio/Semiotic Perspective." *Critical Inquiry* 46, no. 1 (September 2019): 32–55. doi:10.1086/705303.
- — —. *My Mother Was a Computer*. Chicago: The University of Chicago Press, 2005.
- Heibach, Christiane. "Ins Universum der digitalen Literatur: Versuch einer Typologie." *Text+Kritik*, no. 152 (2001): 31–42.
- — —. *Literatur im elektronischen Raum*. Frankfurt am Main: Suhrkamp, 2003.
- Heilmann, Till A. *Textverarbeitung: Eine Mediengeschichte des Computers als Schreibmaschine*. Bielefeld: Transcript, 2012.
- Henrickson, Leah. "Constructing the Other Half of The Policeman's Beard." *Electronic Book Review*, 2021.
- — —. *Reading Computer-Generated Texts*. Cambridge: Cambridge University Press, 2021.
- — —. "Tool vs. Agent: Attributing Agency to Natural Language Generation Systems." *Digital Creativity* 29, no. 2–3 (2018): 182–90.
- Henrickson, Leah, and Albert Meroño-Peñuela. "The Hermeneutics of Computer-Generated Texts." *Configurations* 30, no. 2 (2022): 115–39.
- Higgins, Dick. *Computers for the Arts*. Somerville: Abyss, 1970.
- Higgins, Hannah B. "An Introduction to Alison Knowles's The House of Dust." In *Mainframe Experimentalism: Early Computing and the Foundations of the Digital Arts*, edited by Hannah B. Higgins and Douglas Kahn, 195–99. Berkeley, 2012.
- Johnston, David Jhave. *ReRites: Human + A.I. Poetry. Raw Output*, 2019.
- Joseph Weizenbaum. "Kunst und Computer." In *Computermacht und Gesellschaft: Freie Reden*, edited by Gunna Wendt and Franz Klug. Frankfurt am Main: Suhrkamp, 2001.
- Kaufmann, Manuel. *Dreaming Data. Aspekte der Originalität und Autorschaft in der künstlichen Kreativität*. Zürich: Chronos, 2022.
- Kirschenbaum, Matthew. "Prepare for the Textpocalypse." *The Atlantic*, March 8, 2023.
<https://www.theatlantic.com/technology/archive/2023/03/ai-chatgpt-writing-language-models/673318/>.
- Kirschenbaum, Matthew G. "Spec Acts: Reading Form in Recurrent Neural Networks." *ELH* 88, no. 2 (2021): 361–86. doi:10.1353/elh.2021.0010.
- — —. *Track Changes: A Literary History of Word Processing*. Cambridge, Mass.: Belknap Press, 2016.
- Krause, Manfred, and Götz F. Schaudt, eds. *Computer-Lyrik*. 2nd ed. Düsseldorf: Droste, 1969.

- Kristeva, Julia. *Séméiotikè. Recherches pour une sémanalyse*. Paris: Seuil, 1969.
- Krolow, Karl. “Die Seele wimmert.” *Die Tat*, January 13, 1968.
- Kuhn, Mattis. *Selbstgespräche Mit Einer KI*. n.p.: 0x0a, 2021.
- Landow, George P. *Hypertext: The Convergence of Contemporary Critical Theory and Technology*. Baltimore: Johns Hopkins University Press, 1992.
- Latour, Bruno. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Clarendon Lectures in Management Studies. Oxford ; New York: Oxford University Press, 2005.
- Löffler, Philipp, and Tim Sommer. “Introduction: Institutions of Authorship.” *Authorship* 11, no. 1 (January 31, 2023).
- Lovelace, Ada. “Translator’s Notes to M. Menebrea’s Memoir.” In *Babbage’s Calculating Engines: Being a Collection of Papers Relating to Them; Their History, and Construction*, edited by Henry P. Babbage, 32–50. Cambridge: Cambridge University Press, 2010.
- Luitse, Dieuwertje, and Wiebke Denkena. “The Great Transformer: Examining the Role of Large Language Models in the Political Economy of Ai.” *Big Data & Society* 8, no. 2 (2021): 205395172110477. doi:10.1177/20539517211047734.
- Lutz, Theo. “Stochastische Texte.” *Augenblick* 4, no. 1 (1959): 3–9.
- — —. “Über ein Programm zur Erzeugung stochastisch-logistischer Texte.” *Grundlagenstudien aus Kybernetik und Geisteswissenschaft* 1, no. 1 (1960): 11–16.
- Manyika, James. “An Overview of Bard: An Early Experiment with Generative AI,” 2023. <https://ai.google/static/documents/google-about-bard.pdf>.
- Marino, Mark C. *Critical Code Studies*. Cambridge, Mass.: MIT Press, 2020.
- Max Bense. “On Natural and Artificial Poetry,” March 13, 2023. <https://hannesbajohr.de/en/2023/03/13/max-bense-on-natural-and-artificial-poetry-1962/>.
- Mazzone, Marian, and Ahmed Elgammal. “Art, Creativity, and the Potential of Artificial Intelligence.” *Arts* 8, no. 1 (February 21, 2019). doi:10.3390/arts8010026.
- Meerhoff, Jasmin. “Verteilung und Zerstäubung. Zur Autorschaft computergestützter Literatur.” In *Digitale Literatur II*, edited by Hannes Bajohr and Annette Gilbert, 49–61. München: edition text+kritik, 2021.
- Miller, Arthur I. *The Artist in the Machine: The World of AI-Powered Creativity. The Artist in the Machine*. Cambridge, Mass.: MIT Press, 2019.
- Mitchell, Melanie. *Artificial Intelligence: A Guide for Thinking Humans*. New York: Farrar, Straus, and Giroux, 2019.
- Montfort, Nick. *Twisty Little Passages: An Approach to Interactive Fiction*. The MIT Press, 2003.
- Nilsson, Nils J. *The Quest for Artificial Intelligence: A History of Ideas and Achievements*. Cambridge: Cambridge University Press, 2010.
- Offert, Fabian. “Can We Read Neural Networks? Epistemic Implications of Two Historical Computer Science Papers.” *American Literature* 95, no. 2 (2023): 423–28. doi:10.1215/00029831-10575218.

- O’Gieblyn, Meghan. “Babel: Could a Machine Have an Unconscious?” *N+1* 40, no. 1 (2021). <https://www.nplusonemag.com/issue-40/essays/babel-4>.
- OpenAI. “GPT-4 Technical Report,” 2023. doi:10.48550/ARXIV.2303.08774.
- Piringer, Jörg. *Datenpoesie*. Klagenfurt: Ritter, 2018.
- — —. “Elektrobarden.” *Transistor* 1, no. 2 (2019): 78–83.
- — —. *Günstige Intelligenz*. Klagenfurt: Ritter, 2022.
- Pohl, Roland. “Kann künstliche Intelligenz Lyrik? Nein, meint der Dichter Czernin.” *Der Standard*, February 23, 2023. <https://www.derstandard.at/story/2000143824279/autor-czernin-ein-kreatives-programm-muesste-absichten-haben>.
- Racter. *The Policeman’s Beard Is Half Constructed*. New York: Warner, 1984.
- Reither, Saskia. *Computerpoesie: Studien Zur Modifikation Poetischer Texte Durch Den Computer*. Bielefeld: Transcript, 2003. doi:10.14361/9783839401606.
- Rettberg, Scott. *Electronic Literature*. London: Polity, 2019.
- Rieger, Stefan. “Bin doch keine Maschine ...’. Zur Kulturgeschichte eines Topos.” In *Machine Learning. Medien, Infrastrukturen und Technologien der Künstlichen Intelligenz*, edited by Christoph Engemann and Andreas Sudmann, 117–42. Bielefeld: Transcript, 2018.
- Rumelhart, David E., James L. McClelland, and PDP Research Group. *Parallel Distributed Processing: Explorations in the Microstructure of Cognition. Foundations*. Vol. 1. Cambridge, Mass.: MIT Press, 1986.
- Schäfer, Jörgen. “Passing the Calvino Test? Writing Machines and Literary Ghosts.” In *Digital Media and Textuality: From Creation to Archiving*, edited by Daniela Côrtes Maduro, 23–44. Bielefeld: Transcript, 2017.
- Schönthaler, Philipp. *Die Automatisierung des Schreibens und Gegenprogramme der Literatur*. Berlin: Matthes & Seitz, 2022.
- Schröter, Jens. “Autorschaft aus dem Blickwinkel der Akteur-Netzwerk-Theorie.” In *Grundthemen der Literaturwissenschaft: Autorschaft*, edited by Michael Wetzel, 8. Berlin: De Gruyter, 2022.
- Searle, John R. “Minds, Brains, and Programs.” *Behavioral and Brain Sciences* 3, no. 3 (1980): 417–57.
- Simanowski, Roberto. “Autorschaften in digitalen Medien: Eine Einleitung.” *Text+Kritik*, no. 152 (2001): 3–21.
- Snow, C. P. *The Two Cultures*. Cambridge: Cambridge University Press, 2012.
- Stephen Wolfram. “What Is ChatGPT Doing ... and Why Does It Work?” *Stephen Wolfram Writings*, February 14, 2023. <https://writings.stephenwolfram.com/2023/02/what-is-chatgpt-doing-and-why-does-it-work/>.
- Stickel, Gerhard. “‘Computerdichtung’. Zur Erzeugung von Texten mit Hilfe von datenverarbeitenden Anlagen.” *Der Deutschunterricht* 18, no. 2 (1966): 120–25.

- Stingelin, Martin. “UNSER SCHREIBZEUG ARBEITET MIT AN UNSEREN GEDANKEN: Die poetologische Reflexion der Schreibwerkzeuge bei Georg Christoph Lichtenberg und Friedrich Nietzsche.” In *Schreiben als Kulturtechnik: Grundlagentexte*, edited by Sandro Zanetti, 83–104. Berlin: Suhrkamp, 2012.
- Strachey, Christopher. “The ‘Thinking’ Machine.” *Encounter*, no. 3 (1954): 25–31.
- Turing, Alan M. “Computing Machinery and Intelligence.” *Mind* 59, no. 236 (1950): 433–60.
- Vaswani, Ashish, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, Llion Jones, Aidan N. Gomez, Lukasz Kaiser, and Illia Polosukhin. “Attention Is All You Need.” *Advances in Neural Information Processing Systems* 2017-Decem, no. Nips (June 12, 2017): 5999–6009.
- Wardrip-Fruin, Noah. “Christopher Strachey: The First Digital Artist?” *Grand Text Auto*, 2009. <https://grandtextauto.so.e.ucsc.edu/2005/08/01/christopher-strachey-first-digital-artist/>.
- Weaver, Warren. “Translation.” In *Readings in Machine Translation*, edited by Sergei Nirenburg, H. L. Somers, and Yorick Wilks, 13–17. Cambridge, Mass: MIT Press, 2003.
- Weibel, Peter. “Algorithmus Und Kreativität: Algorithmendesign in Der Literatur.” In *Woher Kommt Das Neue? Kreativität in Wissenschaft Und Kunst*, edited by Walter Berka and Christian Smekal, 85–97. Vienna: Böhlau, 2003.
- Weizenbaum, Joseph. “ELIZA: A Computer Program for the Study of Natural Language Communication Between Man And Machine.” *Communications of the ACM* 9, no. 1 (1966): 36–45.
- Wirth, Uwe. “Der Tod des Autors als Geburt des Editors.” *Text+Kritik*, no. 152 (2001): 54–64.
- Žižek, Slavoj. “ChatGPT Says What Our Unconscious Radically Represses.” *Sublation Magazine*, April 7, 2023. <https://www.sublationmag.com/post/chatgpt-says-what-our-unconscious-radically-represses>.