Artificial Intelligence and other Speculative Metaphors

Mark Blythe*
Northumbria University
Newcastle, United Kingdom
mark.blythe@northumbria.ac.uk

Siân Lindley
Microsoft Research
Cambridge, United Kingdom
sianl@microsoft.com

Dave Murray-Rust
Human Centred Design
TU Delft
Delft, Zuid Holland, Netherlands
d.s.murray-rust@tudelft.nl

Abstract

The paper proposes "speculative metaphors" as constructs for reframing and critically engaging with ideas of artificial intelligence. It identifies a broad range of AI metaphors in the wider culture and technical literature and discusses metaphor design in terms of explanation, persuasion and speculation. To explore different metaphor design strategies, we use a custom GPT to generate a large number of variants on the "artificial intelligence" metaphor. The paper contributes a conceptual framing for such speculative metaphor drawing on ideas of knowledge and understanding, fusion and synthesis, collaboration and collectives. We argue that generating speculative metaphors provides a means of thinking critically about human-AI interaction.

CCS Concepts

• **Human Computer Interaction**;

Keywords

Artificial Intelligence, Speculative Design, Metaphor Design, Human AI Interaction

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1 INTRODUCTION: SWIMMING SUBMARINES, STOCHASTIC PARROTS, AND PLAGIARISM MACHINES

Recent advances in machine learning (ML), and large language models (LLMs), have been so marked that they have revived old debates about whether machines can *think*. For example, a Google engineer became so convinced an LLM had achieved sentience that he went public with his concerns and lost his job [34]. In a much quoted remark, Noam Chomsky compared asking whether a computer can think to asking if a submarine can swim [28], using a metaphor originated by Dijkstra in 1984 [36]. Chomsky invoked another resonant metaphor when he described AIs as "plagiarism machines" [28]. Bender *et al.* suggested "stochastic parrot" as an alternative metaphor for AI, warning against ascribing intelligence to the probabilistic imitations of human communication [9]. The science fiction author Ted Chiang discussed AI as "a blurry JPEG of the Web" [29], implying lossy compression that distorts fine detail. Hicks *et al.* [60] suggested an even more provocative metaphor when they described ChatGPT outputs as "bullshit", using a sociological taxonomy distinguishing between "hard bullshit", intended to deceive, and "soft bullshit", aiming at general plausibility.

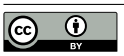
Such metaphors can help us think and talk about what AI *is* and what it *is not*. Some are *persuasive*, in that they frame a particular view of AI while aiming to influence others. Many are also *explanatory*, in that they relate to technical features rather than being purely fanciful or poetic. Phil Agre discussed "generative metaphors" in terms of what they readily assimilate and what they leave on the margins [1]. A stochastic parrot *centres* the meaningless sequencing of tokens based on statistical patterns, while *marginalizing* model reasoning. A blurry JPEG *centres* data compression while *marginalizing* agency and interaction. Calling a system a *tool* centres applicability and reliability, while calling it a *collaborator* centres agency and intellectual connection.

This is more than rhetoric because, as Lakoff and Johnson [68] observed, metaphor is central to human thought. In their seminal book *Metaphors We Live By*, they argue that metaphors can shape our beliefs, perception and comprehension. Metaphors are pivotal, not only for end-users, but also for policy makers, designers and users. For example, Microsoft's "Copilot" metaphor foregrounds a subservient relationship between the system and its user, suggesting assistance rather than total reliance. It also connotes aviation and so suggests the possible risks of overreliance on automation, opening up room for critique [98]. As we seek to understand, build, design for, and appraise future ML technologies, metaphor matters. This paper argues that consciously generating, engaging with, and critiquing metaphors must be part of our design practice.

There is a growing body of work in HCI that looks to metaphor for productive and evocative framings of technology, to develop new insights and perspectives. For example, *New Metaphors* cards [72] generate random correspondences to provoke creative thinking, while *Metaphor Shifts* [81] experiments with playful or poetic framings. Dove and Fayard's workshops ask speculative questions like, "what if learning machines were monsters?" [38] and *Metaphor Gardening* [82] treats metaphors as seasonal, with some finding fertile ground in a project's "soil" while others are weeded out.

In this paper, we trace the historical use of AI metaphors to illuminate how they have shaped the discourse around mathematical operations and computational agency. Speculative metaphors are suggested as a tool to foster critique, exploration, and ideation, building upon traditions of speculative design and design fiction, but focussing on language. Unlike metaphors that seek to *explain* how to use a technology (such as, for instance, the "desktop"

*Corresponding author.



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metaphor), or *persuade* people about what it "really is" (the "stochastic parrot"), speculative metaphors seek to open design spaces. As an illustration, we develop a custom GPT Metaphor Maker for generating new speculative metaphors, which builds upon cultural and technological histories of artificial intelligence.

Although we experiment with machine generated metaphors, our goal is not to advocate such tools as the best way of creating speculative metaphors. Advocating for an AI solution to the problems of AI metaphor would make for a deeply solutionist approach, implying a quick fix for complex problems. For this reason, we make no claims regarding the utility or functionality of the tool and conduct no empirical evaluation as this would undermine the arguments we are making. Outputs from the tool are considered solely to indicate the dimensions of the metaphor design space. Following these exercises in *metaphoring* we discuss how speculative metaphors might play a role in exploring intelligence, originality, and knowledge networks.

The following section explores the historical use of AI metaphors in culture and mythology, before considering alternative framings in the historical technological literature.

2 AI IN MYTHOLOGY AND HISTORY

The word "automata" can be traced to Homer's *Iliad* which refers to mechanical, self-propelling devices crafted by the Gods. In *Gods and Robots*, Adrienne Mayor finds automatons in a surprisingly large number of ancient world myths [77]. Although the story of Pandora's Box is well known, it is often forgotten that Pandora herself was an artificial creation. Zeus ordered Hephaestus, the God of craftsmen and artisans, to make Pandora in the form of a seductive woman. This artificial being is designed to trick humanity into releasing the evils in her box as a punishment for accepting fire stolen by Prometheus. Mary Shelley references this myth directly in the subtitle of *Frankenstein: A Modern Prometheus* [102], and the idea of hubristic disaster resonates through subsequent science fiction.

Karel Čapek coined the word "robot" in his play R.U.R. in 1920 [23], in the first of many sci-fi stories describing a rebellion of synthetic creatures against human masters. The *Westworld* universe explores this theme, as does the *Terminator* franchise, the *Dune* saga also includes a war against thinking machines. Philip K. Dick's *Do Androids Dream of Electric Sheep*? [37] is an extended thought experiment on the differences between artificial and human life. Themes of sex and companionship with AI have been explored in movies including *Ex Machina* [45] and *Her* [59], as well as TV shows like *Humans* [62]. Jeanette Winterson's novel "Frankissstein" [113] revisits Mary Shelley's foundational story through AI sex dolls [116]. A recent international cross-cultural study of AI in culture highlights resonances and divergences in representations of machine intelligence from central Europe, the Soviet Union, the Americas and Pacific. The editors warn against the "Californian feedback loop" where the entanglements of Hollywood, big tech and academia co-construct dominant AI imaginaries [25].

The edited collection *AI Narratives* [24] makes arresting connections between the idea of artificial intelligence and the act of literary representation itself. For example, Anthony Trollope's novels were considered such an accurate imitation of life that contemporary critics compared his work to photography, dismissing it as mere documentation [112]. Similarly, critics of Charles Dickens have found his characters' catchphrases and repeated mannerisms to be as lifeless as clockwork (ibid). Julie Park traces the development of "artificial voices" from speaking dolls to Alexa, arguing that notions of artificial voice often slip towards ideas of artificial intelligence [24].

One of the most frequent plot forms for AI stories in popular culture is "Overcoming the Monster" [17], with monsters including *Talos* in Greek mythology, *the creature* in Frankenstein, the gunslinger in *Westworld*, the T800 in *The Terminator*, Roy Batty in *Bladerunner*, and so on. These are all powerful images, and some of the implicit metaphors are sticky and evocative. Frankenstein's monster is made of disparate human body parts, evoking parallels to large language models trained on multitudinous traces of human activity. As these cultural metaphors carry such weight, they often shape how we discuss and critique new and emerging technologies. Such metaphors resonate not only in fiction but also in the research and development of technology.

2.1 Technology Histories

In a 1945 article called *As We May Think*, Vannevar Bush [22] sought to motivate scientists to make the "bewildering store of human knowledge" more available and accessible to ordinary people. He illustrated his ideas with a theoretical device he called the "MEMEX machine", which he described as a circular desk storing mechanized books, records and communications, made available through "slanting translucent screens and a keyboard with buttons and levers". Although his description of the imaginary device drew on microfilm and projectors, it inspired the electrical engineer Doug Engelbart to apply emerging computing technologies to realise similar ideas. Engelbart saw his work in terms of an organized effort to harness "the collective human intellect" [19].

By the mid-1950s, mathematicians like Marv Minsky and John McCarthy began to wonder if computers might be able to reason and learn. McCarthy wrote a Rockefeller grant application to "*find out how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans and improve themselves*" (ibid p. 42). The funding he received enabled him to hold a conference in 1956 which he called the "Dartmouth Summer Research Project on Artificial Intelligence", a title chosen partly to avoid the term "cybernetics" favoured by Norbert Weiner. Alternative terms included Simon's "complex information processing" but McCarthy felt nobody would invest in something so "dry" [70]. The Dartmouth conference is generally regarded as marking the birth of AI. The new field attracted a great deal of U.S. government funding in the 1960s and 1970s, in part because of its military implications. But enthusiasm and funding began to wane when initial expectations were not met, leading in the 1980s and early 90s to another evocative metaphor: the "AI Winter".

During this winter, Hubert Dreyfuss, a Heideggerian philosopher, published the book "*What Computers Still Can't Do*" [39], which claimed that the notion of artificial intelligence was fundamentally mis-founded because human understanding is embodied. Dreyfuss argued that intelligence is a gestalt formed by our engagement with environments that are physical and biological but also psychological

and social. Such critiques helped shape alternative approaches to building ever larger datasets and more detailed heuristics [111]. Researchers began to pursue more discreet and embodied forms of intelligence addressing specific tasks and contexts, for example, light-seeking robots.

Such focussed efforts produced some of the most practical successes in AI at that time. In the 2010s many breakthroughs resulted from the development of Generative Adversarial Networks (GANS), consisting of a generator and a discriminator working in competition [52]. This resulted, for example, in AI generated faces that were difficult to distinguish from photographs of real people. Such techniques have brought the field far from its origins in modelling human cognition, with contemporary systems rooted in the corpora they are trained on and the human feedback they receive. Yet it is hard to get away from anthropomorphic vocabulary: terms that frame systems as *adversarial*, *learning*, or *intelligent*, are all suggestive of human-like thought, to varying degrees. Simon's "complex information processing systems" sidesteps many of the critiques associated with "artificial intelligence", but it is rarely used [70] and, despite the academic preference for less evocative terms, "AI" has entered the language.

To explore the connections between culture, language and technology, the next section discusses what metaphors are, before considering some alternative AI metaphors.

3 FRAMING AI: MATTERS METAPHORICAL

The Greek word "metaphora" means to "carry over" or to transfer. Words that we consider as having "literal" meanings are often forgotten metaphors. For example, the word "literal" is now associated with exact, nonfigurative speech, as when we say "literally!" for emphasis. Yet, the etymological root of that word is the Latin "literalis", meaning "of or belonging to letters or writing". So, when we exclaim "literally!", we are usually speaking metaphorically.

The influence of language on thought has been debated by sociolinguists for many decades. Benjamin Whorf and Edmund Sapir argued that changes in speech can lead to changes in thought. For example, Whorf relates that while analysing insurance claims he noticed that gasoline drums were not perceived as dangerous if the word "empty" was used to describe them, even though they contained explosive gas [114]. Subsequent scholars have developed strong and weak versions of the "Sapir-Whorf hypothesis", which posits that to change the way we speak is to change the way we think.

The development of technologies often give rise to new metaphors. During the Enlightenment, machine metaphors for human organs became widespread and they supplied the emerging medical profession with novel ways of seeing, speaking and thinking about the body [80]. The development of valves, for example, provided new metaphors for the heart and lungs which enabled understandings which would otherwise been unthinkable (ibid).

Conversely old technologies can become metaphors for new ones. Perhaps the most iconic design metaphor in HCI is the "desktop". Although it has now been many years since offices were furnished with metal cabinets that stored files of paper held in cardboard folders, the metaphor of computer *files* persists. In a landmark review, Alan Blackwell argues that metaphors which seem intuitive are often just what we are used to. Similarly old metaphors persist in framing the way we engage with the world wide web [118]. Early metaphors likened the internet to physical infrastructure with terms like *superhighway* emphasising connectivity. Others cast it as a broadcaster, shopping mall or terrain that we might explore or *surf*. Such metaphors shape expectations, interaction patterns, and adoption behaviours. Similarly, metaphors for AI have the potential to frame not only language but thought, perception and behaviour.

3.1 Metaphors and Generative AI

Generative AI (GenAI) can now accomplish tasks that were thought decades. OpenAI [91], Google [93] and Meta [58] are amongst the organisations aiming to build technologies that can demonstrate "artificial general intelligence". But GenAI models cannot yet perform complex reasoning. Assembling something that looks like a plausible solution is not the same as working out an actual solution [100] [57]. The term "artificial intelligence" is, of course, itself metaphorical. It anthropomorphises large language models, conflating data driven outputs with human like reasoning. At the same time, it foregrounds notions of *agency*, leading to a potential abdication of responsibility whilst simultaneously *marginalizing* the human labour behind the systems [53] [88]. Even computational resources as powerful as the latest LLM offerings require human labour in terms of the datasets they are trained on, the human feedback they are shaped by [95], the users supplying prompts, and interpretations to make sense of outputs [49].

Training data remains a focal point in the discourse around GenAI. The Open Knowledge Foundation's slogan, "the right to read is the right to mine", sets up the idea that scientific knowledge should be liberated through text "mining" [83], a metaphor that positions data as a resource to be consumed [32]. The approach chimes with Vannevar Bush's [22] call to make all human knowledge accessible and parallels can be drawn with human creative practice. Sarkar [97] [97] makes a case that all creative work is rooted in reuse, and empirical studies have demonstrated that "remixing" is an integral part of creative work [71] [108]. Yet the kind of reuse enabled by GenAI is qualitatively different to human reuse; Meta's defence that building models is "quintessential fair use" [20] is under heavy scrutiny in multiple legal cases brought by writers and artists. Nevertheless, drawing hard lines between copying, remixing, reusing and taking has been historically problematic, especially when it comes to digital content. In the early 2000s music industry bodies like the RIAA argued that sharing music files was theft, but this was never a universally accepted metaphor, in part because copying digital files involves multiplication rather than subtraction [13].

Some AI metaphors attempt to persuade quite subtly, for example, the idea of an LLM "hallucinating" when it produces "content that is nonsensical or untruthful in relation to certain sources" [89], This pushes aside other less generous metaphors such as "fabricating" or "deceiving". "Hallucination" provides a way to describe some of the newer phenomena of GenAI but does little to help people understand that the emergence of hallucinations is a direct outcome of the ways in which the underlying technology operates. Hicks *et al.* point out that there is no technical difference between a

ChatGPT output which is correct and one which is not – for this reason they reject the term hallucination and argue that ChatGPT is specifically designed to produce "soft bullshit", in that plausible imitation is a central design objective [60].

There are numerous technical, ethical, and legal issues surrounding AI, and alternative metaphors seek to frame the discourse in very different ways, e.g., *hallucination*, *mining*, and *theft*. These metaphors can shape both the ways in which people understand AI and the practices it enables. Metaphors are used to project the technology into the world, to shape the social and legal debates around it, and to insert viewpoints into the collective consciousness. The following section explores some of the ways alternative metaphors can be designed.

4 METAPHOR DESIGN

The metaphors discussed so far can be grouped into broad and overlapping categories, *explanatory*, *persuasive* and *speculative* metaphors. These distinctions are necessarily blurry, as (i) we cannot really divine motive, and a single metaphor may be used differently in different contexts, and (ii) there must be some overlap, e.g. a metaphor is unlikely to be persuasive unless it feels explanatory. Despite the blurring, we found these distinctions to be useful for thinking about what was being done within the wide political economy of AI.

Explanatory metaphors can be used to make complex or specialised concepts accessible to non-experts. These are typically cognitive metaphors [68] that map AI functioning onto human activity. For example, the term "training" is often used because the mechanism of "backpropagation" is a technical concept, and the system's equations can be difficult to grasp. However, the 'training' metaphor can also mislead as it brings associations with the ways that humans learn or the ways that animals are trained. AI as a field is particularly prone to 'wishful mnemonics' [x via y] where qualities and capabilities are described analogically and hopefully, whether or not the technical implementation supports the metaphorical intent. Even so, explanatory metaphors can help map unfamiliar domains of computation onto something comprehensible and provide a way of getting to grips with underlying mechanics. The 'adversarial' in GANs serves as a useful shorthand for two networks optimising quantities that are initially negatively related, whether or not they can be truly considered 'adversaries' in a deep sense.

Persuasive metaphors articulate a particular perspective on the technology. Examples here include "stochastic parrots", "plagiarism machines" and "bullshit". These are grounded in technical realities but explicitly centre a particular aspect of the systems to shape a narrative. Persuasive metaphors are often used to shape broader public attitudes towards technology – a classic related example being "data is the new oil", framing it as an untapped resource for exploitation [107]. These are places where metaphors compete for the futures they describe, as opinionated descriptions of technology shape public perception. Persuasive metaphors like "surveillance capitalism" [121] and "AI slop" are useful as they give form to previously unarticulated dynamics. The stochastic parrots and plagiarism machines of current AI discourse are in direct opposition to industry driven terminology like "foundation models" which frame these technologies as objective and robust building blocks. Not all persuasions are overt – as discussed above "hallucination" sounds relatively innocent, implicitly casting LLMs as generally truthful and grounded in reality, despite occasional lapses. Nolan argues that "metaphoring should be considered a lifelong learning skill" and introduces the idea of "metaphoring back" – that is, using metaphors explicitly and critically to shape the developmental pathways of the technological context [87].

Speculative metaphors emphasise exploration rather than explanation or persuasion. In the late 1990s, Anthony Dunne and Fiona Raby developed "critical design", positioning design not as a solution to pre-defined problems but rather as a means of critique [40] [41]. The term was later modified as "speculative design", emphasising more open-ended approaches [6] [42], and this sensibility informed the development of design fiction, which now takes a wide variety of forms e.g. [12] [30] [31] [103]. Speculative metaphors build on this body of work but focus on language itself to reframe thinking. The aim is to use these metaphors neither to explain nor persuade but rather open up design spaces.

To explore some examples, Lockton et. al.'s *New Metaphors* cards [72] are a set of cards, and a website that generate pairings of physical phenomena along with something it could be a metaphor for, for example, "how could a flock of birds be a metaphor for data privacy?". This generates creative possibilities, and opens new ways to think about technology; in a similar vein, Alves-Oliveira *et al.* [2], generated metaphors and then applied them to robots; "how can a robot as a shoulder parrot be a metaphor for disobedience?" (ibid). Such questions helped research participants re-think their assumptions not just about the physicality of robots, but also the ways they might interact with them. In a similar vein, using the metaphor of robots as 'sidekicks' helped position relations to the technology [74]. *Metaphor Shifts* [81] is an exercise to find productive and generative ways to relate to the technology for a particular project. It encourages designers to try out diverse metaphors particularly those that are exuberant, awkward or initially baffling, in order to open new conceptual frames. This is further developed as *Metaphor Gardening* [82] where metaphors for technology are cast as things to cultivate, harvest, explore – and to let die when they are out of season. The intent is that designers consciously experiment with metaphors as part of their process, using them to enrich their conceptual maps while speculating on what *might be*. Nicenboim *et al.*'s *Conversation Starters* [86] is an example of a speculative metaphor directly applied to the process of developing AI systems. This is an installation piece that frames the development of conversational AI as a "kombucha SCOBY", a cellulose mat, housing yeast and bacterial cultures that process sugar into lactic acid. Rather than drawing on concepts of *building* or *creating*, the Kombucha scoby is grounded in nurture and the provision of support as something develops.

In all of these cases, the metaphor works partly to defamiliarize the technology, but also as a prompt to imagine new forms. For example, the idea that LLMs are grown highlights the idea that one can be selective about the data fed to models, and that particular kinds of nourishment might be better for healthy and desirable growth. But the cultivation of unlikely metaphors is not new - metaphysical poets like John Donne used to delight in making unusual metaphors comparing, for example, the legs of a compass

to two lovers. Speculative metaphors are a tool to explore different connections, shaping both the design process and communication about finished products.

5 GENERATING METAPHORS

We began experimenting with GPT 3 using prompts for "*a list of alternative terms for artificial intelligence that express x critiques of AI*" where x was a particular perspective. These prompts incorporated diverse viewpoints including historical and technological critiques (e.g., mimicry and intellectual property theft); political and economic frameworks (e.g., surveillance capitalism); ideological positions (e.g., Marxism, feminism, social justice); and psychological approaches (psychoanalysis). As with any AI generated content, some outputs were more resonant than others. Several outputs could be thought of as persuasive or didactic:

"**algorithmic governance**" echoes Virginia Eubanks' warnings around "Automating Inequality" [44];

"**autonomous misogynoir**" links to Moya Bailey's term for misogyny directed towards black women [7];

"**mimetic intelligence**" evokes Microsoft's Tay chatbot's mimetic programming which was quickly subverted to spew racist alt right opinions [110], as well as the "truly conversational" style of recent LLMs, Anthropic Claude being one example [4];

"**robotic piracy**" connects the mechanical slaves of Čapek's play [24] to seafaring outlaws and the anti-file sharing campaigns of the 1990s;

"**technological narcissism**" references a young man in love with his own reflection pursued by his unrequited lover Echo [92], and links it to contemporary notions of filter bubbles and echo chambers [109].

Although these metaphors draw heavily on previous critiques, some were provocative enough to motivate further exploration through a custom GPT. Again, the aim of making this was not to produce better or final metaphors but rather to further explore the space of AI metaphor design.

5.1 Developing an AI Metaphor Maker

In late 2023 OpenAI launched a GPT builder which allowed users to make custom GPTs for specific tasks using natural language instructions. Early examples included a "laundry buddy" and a "creative writing coach" [90]. By December 2024 there were 159,000 public custom GPTs available on the GPT store platform with popular GPTs including a blog wizard, a "Dejargoniser" and a Math mentor [99]. These custom GPTs operate on OpenAI's current model and rely on pre-training data, but users can shape and constrain outputs so that they perform particular tasks. Leveraging this infrastructure, we built a GPT "AI Metaphor Maker".

The custom GPT was made using an expanded version of the literature review for this paper as a primary resource. This document provided a longer and more detailed account of the literature discussed so far. The document also contained a framework of example metaphors (table 1). This was generated by prompting

Table 1: Framework Mapping Critical Perspectives to Alternative Metaphors

Mimicry	Surveillance	Social Justice	Marxist	Feminist	Psychoanalytic	Theft
Imitation Intelligence	Automated Surveillance	Technological Oppression	Capitalist Automation	Automated Patriarchy	Mechanized Egoism	**Robotic Piracy**
Mimetic Intelligence	Automated Tracking	Automated Inequality	Automated Exploitation	Automated Oppression	Automated Unconsciousness	Automated Intellectual Property Theft
Simulated Thinking	Cognitive Profiling	Algorithmic Bias	Technological Oppression	Cognitive Patriarchy	Cybernetic Neurosis	Unauthorized AI Duplication
Simulated Cognition	Machine Monitoring	Data Discrimination	**Labor-Replacing Machines**	Machine Inequality	Algorithmic Anxiety	AI Plagiarism
Replicated Cognition	Automated Data-Mining	Automation Injustice	Alienating Automation	Automated Exclusion	Robotic Insecurity	Cyber-Theft of Knowledge
Copycat Intelligence	Neural Data-Extraction	**Predictive Injustice**	Proletarian Automation	Neural Discrimination	**Technological Narcissism**	AI Crime
Reproduced Thinking	Intelligent Apparatus	Automated Racism	Working Class Automation	Intelligent Misogyny	Programmed Self-Deception	Technological IP Theft
Artificial Replication	**Autonomous Data-Harvesting**	AI Privilege	Robotic Domination	**Autonomous Misogynoir**	Virtual Paranoia	Computerized Copyright Infringement
Computer Simulation	Automated Privacy-Invasion	Surveillance Capitalism	Machinic Servitude	Automated Misogynistic Bias	Synthetic Entrapment	Automated Plagiarism
Cyber Mimicry	Knowledge Exploitation.	Exploitative Automation	Systemic Exclusion	Knowledge Inequality	Automated Ignorance	Automated Copyright Infringement

for two-word alternatives to "artificial intelligence" drawn from particular domains or schools of thought.

The following is an example of the prompts which generated each list in the columns of the table: "*Generate a list of alternative terms for artificial intelligence that express intellectual property theft critiques of AI*". As with any AI output some were more resonant than others. The ones which are underlined in the table are those which appealed to us because they resonated most with current critiques of AI: "*Cyber Mimicry, Algorithmic Governance, Automated Data Harvesting, Predictive Injustice Labor Replacing Machines Autonomous Misogynoir, Technological Narcissism, Robotic Piracy*." Of course, these examples do not constitute any kind of exhaustive taxonomy, but they indicate the approach and initial outputs which were refined with fine tuning and human feedback.

We chose to make a custom GPT tool not as a means of generating optimal or authoritative metaphors but rather as a way of exploring metaphors in the context of a large language model. The GPT was designed as a means of provocation and collaboration in the hope of surfacing unexpected associations and amplifying cultural associations. Given that LLMs are already shaping public discourse about AI, using one to explore that discourse seemed like an interesting opportunity. Crucially the outputs were not accepted uncritically but reviewed, refined and situated within broader literature and discussion. This procedure stresses the crucial role of human judgement and contextual interpretation in working with generative systems.

Outputs from the GPT were iteratively reviewed and refined for relevance, resonance and clarity. For example, provocative examples like "cyber mimicry" and "automated data harvesting" were reinforced through human feedback. The fine-tuning process, conducted over three months, constituted a tiny fraction of the model compared to its pretrained base. Although the fine-tuning of custom GPTs represents a far smaller proportion of training effort, the impact on outputs is disproportionate. For example, a custom GPT that only ever returns the word "cheese" requires very little effort to make but the results of a simple natural language instruction to only output no other word has a large effect. Figure 1 shows an example prompt and output from the AI Metaphor Maker GPT:

Many of the campaigns against AI art echo campaigns by the music industry in the early 2000s which positioned file sharing as theft. The prompt for metaphors drawing on such positions contains a range of examples, some of which are cringe making (e.g., Knowledge Riff) while others express a persuasive position succinctly e.g., Digital Plagiarist. Others, such as "Information

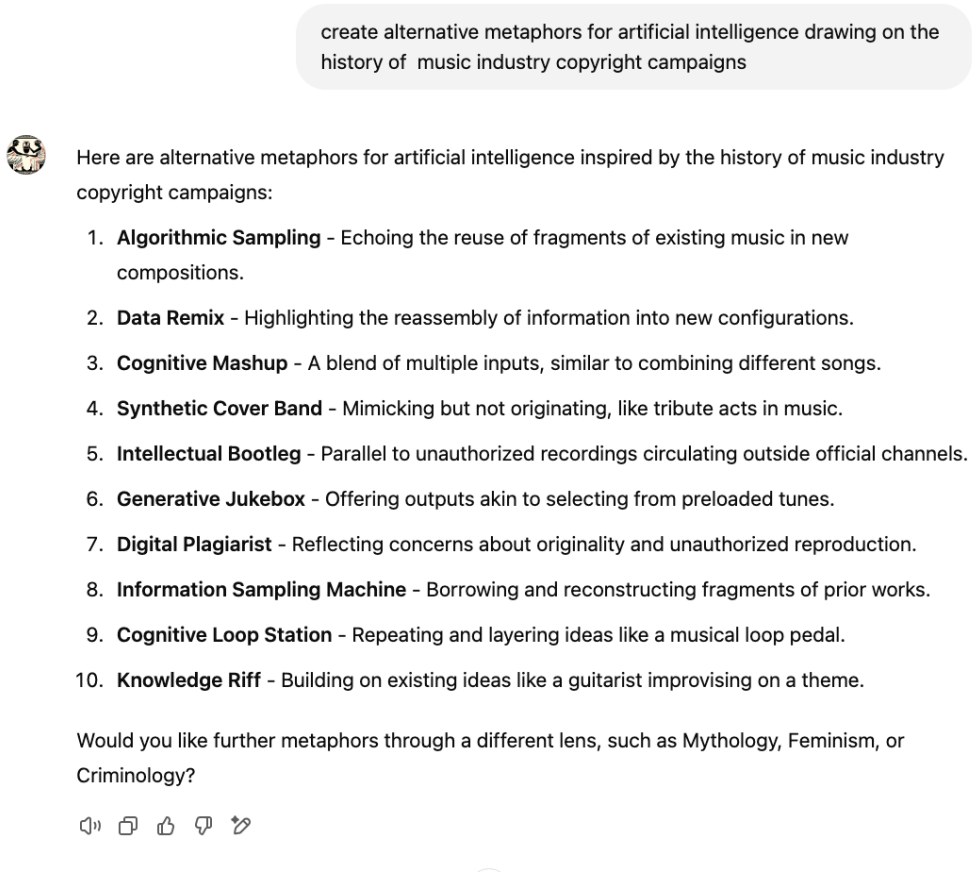

Figure 1: Sample Prompt and Output from an AI Metaphor Maker GPT

Sampling Machine" are somewhat more evocative due to their ambiguity. The range outputs shown in figure 1 is fairly typical in terms of its highly variable quality.

5.2 Example Outputs

The GPT was most effective when prompted with unusual or underexplored source domains. For example:

Theology produced "*machine omniscience*" and "*neural enlightenment*" both of which resonate with Bogost's critique of the deification of the algorithm [16];

Afrofuturism resulted in terms like "*Techno Orisha"* (merging technologies with spiritual entities), "*Cyber Ubuntu"* (suggesting community connectedness) and "*Quantum Diaspora"* (dispersed yet interconnected knowledge).

Environmental critiques led to "*emissions engine*", "*warming algorithm*" and "*data furnace*";

Geometry outputted "*fractal engine*", "*tessellation matrix*" and "*topological navigator*" echoing ideas of the reflexive feedback loops with the social media on which it has been trained.

Oblique prompts could also be interesting. For example, "sandwich" as a source domain generated "*codewich*", "*logic wrap*" and "*machine stack*", and a prompt for "podiatry" produced "*neural step*" and "*systemic orthotic*".

The Metaphor Maker was designed to generate explanatory, persuasive and speculative metaphors. As we have emphasised, metaphors are neither correct nor incorrect but rather provide alternative perspectives. For this reason, formal analyses of the tool's outputs would be inappropriate and contrary to the project's goals.

We make no claims for the utility of the tool. Although some of the outputs were interesting in themselves, we found that some of the less satisfactory variants could also provoke further thought and debate. All the machine generated metaphors referenced in the next section were refined by the authors so, again, the outcome of a systematic evaluation of the GPT tool would be both trivial and uninteresting. The purpose of this work was not to build or validate a specific tool but to open up the metaphor design space.

Empirical evaluation of the tool would risk misrepresenting the project's focus which lies in articulating metaphor design as a critical technical practice. Having made a deliberate choice not to conduct an evaluation, the following section is a discussion of metaphors which we found to be compelling or provocative. These include outputs from the Metaphor Maker AI, modified through discussion and reflection.

6 SPECULATIVE METAPHORS

This section discusses speculative metaphors drawing on the following related and overlapping domains: understanding and wisdom, fusion and synthesis, collaboration and collectives.

6.1 Metaphors of Knowledge and Understanding

Metaphors drawing on "intelligence" can suggest a binary distinction whereby intelligence is either present or lacking. But there are different forms of intelligence. Animal intelligence has been suggested as an alternative framing which foregrounds otherness while allowing for a 'more-than-human' approach to understanding technology [85]. Whether we follow Wittgenstein's proposition that if a lion could speak, we would not be able to understand it [117], or Nagel's position on the fundamental unknowability of a bat's experience [84], the metaphors point to a different relation to the world. Humans experience the world through an *umwelt* – a self-world, shaped by sense perceptions and interpretations of our environment [43]. By contrast the umwelt of a large language model, if it can be said to have one, is textual. In this sense it is very remote from human experience. When prompted for metaphors drawing on ideas of the umwelt, the Metaphor Maker suggested ***Synthetic Perception*** and ***Coded Reality.*** These terms are far from lived experience but resonate with the ways we present our digital selves.

The language of the Ancient Greeks differentiates between different forms of knowing and Aristotle distinguishes between understanding, sense perception, imagination and meaning. In *De Anima* he defines "nous" as "the part of the soul by which it knows and understands" [117]. This form of knowing is not simple sense perception and resonates with Dreyfuss' distinction between "knowing how" and "knowing that" [21]. When prompted to draw on Greek words for understanding, like 'nous', the Metaphor Maker suggested ***Machine Dianoetics*** (discursive reasoning) as well as **Techno-gnosis** (suggesting hidden specialized knowledge). Some of the other metaphors in this space were quite evocative, including ***Epistemic Network, Logos Machine*** and ***Heuristic Sophia***.

Conversely, foregrounding a lack of understanding and building on Frankfurt's taxonomy of bullshit, yielded terms like ***simulated conviction, algorithmic deception*** and ***synthetic persuasion***. Alternatives for "hallucination" include ***algorithmic bluff, simulated pretence*** and ***artificial fiction.*** These metaphors underscore uncomfortable aspects of interacting with LLMs where the lack of human experience gives rise to "***artificial empathy***". This is most obvious when LLMs issue apologies or offer congratulations. As Dreyfus [39] observed, performance of an action does not signify understanding.

While a computer may not possess nous or know-how, a person can bring much of this to bear on an interaction. Use of LLMs is always situated in the context of a wider system, where activity and cognition are dispersed across machines and humans. In the next section we explore metaphors that highlight intelligence as distributed, collaborative and emergent within the context of relationships.

6.2 Metaphors of Fusions and Synthesis

The field of "distributed cognition" [63] recognizes that intelligence is not confined inside our heads but rather distributed across resources that we can access, such as books and databases. In this sense, AI may be thought of as another resource of distributed cognition that could be positioned as a distinct form of collaboration, particularly when foregrounding its roots in human labour [96]. When prompted to draw on distributed cognition to generate metaphors, the Metaphor Maker suggested terms like ***Cognitive Cloud***, ***Collaborative Matrix*** and ***Mind Grid***. Such conceptions of AI resonate with current revaluations of Ada Lovelace's notion of thought and human-machine originality: "the machine itself

cannot originate, but when combined with human intelligence, a distinct form of originality emerges" (Lovelace, cited in [24] p. 146). While AI may be confined to mimicry, originality arises in the context of human-AI interaction [97]. In this sense, AI technologies enable different ways of knowing and creating when embedded in collaborative contexts.

The importance of interaction is often neglected in accounts that ascribe intelligence to computational systems [106]. Metaphors that draw out relationships tend to anthropomorphise (e.g., positioning AI as an apprentice, teammate or co-pilot), while metaphors that demarcate the nature of AI technologies can deify or demonise – positioning AI as theistic [104] or monstrous. Metaphors in this domain include ***Digital Deity*** and ***Machine Messiah*** amongst other rather alarming, yet well-trodden possibilities.

Relational metaphors, while anthropomorphic, rarely emphasise the relationship itself as the site of intelligence. In one example of this, Taylor [106] examines practices around technologies including Roomba vacuum cleaners to unpack the relational aspect of 'machine intelligence'. Vacuum cleaners that initially appear to be 'dumb' can, over time, be seen to show 'a little' intelligence. Taylor argues that this intelligence does not lie in the technology itself, but in the "ordinary, unremarkable relationships we have with things". The coordinated efforts of people (who orchestrate their homes to make them accessible to their Roomba) and the machine (which navigates a terrain that has been set up specifically to enable it to clean) show how intelligent behaviours emerge with time and investment by the users. This suggests alternative terms – Taylor uses '**emergent intelligence**'; '**collaborative intelligence**' is another that emphasises the essential role of human agency in shaping interactions with AI-enabled systems.

6.3 Metaphors of Collaboration and Collectives

With advances in large language models the potential for distributed and collaborative intelligence grows, raising questions about where intelligence is sited and how it is co-produced. When prompted around collaboration, the Metaphor Maker suggested ***Thought Amplifier*** and ***Co-creative Engine***. These highlight the interplay of human and machine contributions, suggesting an intelligence that emergences through dynamic iterative interactions. As AIs interact with other AIs, their communications and actions are likely to become increasingly invisible or uninterpretable to the human user. It also seems likely though that agentic networks will become embedded in technologies that proactively act on their user's behalf without explicit commands. Here the notion of distributed intelligence is salient, but questions remain as to how the user brings their own intelligence to bear in increasingly implicit and diffuse interactions. Metaphors like the **collective intellect** echo Engelbart's ambition to harness "the collective human intellect" and may still be a useful way of thinking about General Artificial intelligence (GAI).

7 DISCUSSION AND CONCLUSION

This paper positions speculative metaphors as a critical approach to engage with the broader implications of metaphor design and its potential to shape understanding, critique and innovation. Dreyfus [39] foregrounds the gulf between imitation of human intelligence and understanding, and Taylor [106] highlights the essential role of humans in 'bringing intelligence' to interactions with machines. Exploring speculative metaphors in the context of such prior work uncovers relational metaphors of intelligence which emphasise the dynamic and emergent nature of human AI interaction. For example, the AI Metaphor Maker GPT itself can be understood as an example of augmented or distributed intelligence, blending human creativity with computational outputs to co-develop ideas. The design and iterative use of such tools may best be thought of as "dialogical" in McCarthy and Wright's sense of a human computer interaction that is an emotional and volitional encounter between self and other [75].

While relational metaphors can be useful, they also present challenges, particularly as interactions with ML technologies become more implicit, and the systems more connected and distributed. As AI shifts from visible task-oriented tools like chatbots to more infrastructural roles, creative metaphors may offer critical understandings of these transformations. Just as terms like "surveillance capitalism" [121] articulated previously opaque aspects of systems design, speculative metaphors may play a role in helping users navigate evolving relationships with complex ML systems.

Ongoing innovations in ML technologies are likely to have profound impacts on almost every aspect of our lives. Some of these will be anticipated and beneficial while others may be unintended and catastrophic. Metaphors are neither correct nor incorrect; they reveal certain aspects of the thing described while concealing others [68]. In doing so they can shape the ways we think and the systems we build. This paper has sketched a range of domains from which metaphors may be drawn, including knowledge and understanding, fusion and synthesis, collaboration, and collectives. Although metaphors are neither true nor false they are also far from being neutral. Thoughtful and deliberate metaphor design may help us take advantage of the opportunities these technologies offer and perhaps mitigate some of the risks that they pose.

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