TRENDSPOTTING: WHY THINGS MATTER?

The Hearth Lecture Series

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Creativity or Code?

For decades, we've pondered the question: Can machines truly replace humans? One of the most profound ways to approach this is by asking whether machines can be creative. Because creativity has always been seen as a distinctly human expression—a manifestation of emotions, experiences, and imagination. It reflects the complexity of our minds, the richness of our cultures, and the depth of our personal and collective journeys.

If a machine can be creative, it suggests that it can replicate not only functional tasks but the very essence of human intelligence. If machines are capable of producing literature, music, or visual art that moves us emotionally or challenges us intellectually, then what does that say about their ability to replace us in other ways? This question goes beyond mere technical ability—it touches on the question of whether machines can understand, emulate, or even surpass the depth of human consciousness. From Roald Dahl's *The Great Automatic Grammartizer* to the dystopian masterpiece *Metropolis*, the tension between human and machine-generated output has fascinated and unsettled us. Dahl's short story, published seven decades back in 1953, imagines a world where a machine, the *Grammartizer*, overtakes human writers and mass produces novels that rival the quality of human creativity. Fritz Lang's Metropolis (1927) is a silent film set in a dystopian city. The wealthy control the working class. The plot revolves around a robotic woman (the "Machine-Man") who manages to manipulate the workers of Metropolis while impersonating a human. The film brings to the fore the fear of technology displacing human identity, agency, and labour.

While machine learning forms the backbone of many computational processes by allowing systems to learn from data, artificial intelligence goes a step further, enabling machines to simulate human-like creativity and decision-making in generating original works. If artificial intelligence (AI) can generate works that evoke the same responses as human-created art, are we closer to machines replicating our minds? And if they can, what then distinguishes human creativity from artificial creativity?

While AI, including generative AI, has decades of history, we discuss the impacts of the recent leapfrog in this technology. The introduction of GPT (Generative Pre-trained Transformer) models in 2018 by OpenAI was transformative. Since the launch of ChatGPT in 2022, the long-standing debates around technology replacing humans have resurfaced with renewed fervour. The rapid advancements in AI, particularly in generating text, images, and even complex problem-solving, have reignited concerns that have echoed through decades of technological progress. Just as in past eras—when industrial machines replaced manual labour or computers revolutionised office work—there is growing anxiety that AI tools may

encroach upon creative and intellectual domains traditionally reserved for humans. Whether AI can or should replace human thought and ingenuity has once again become a focal point of societal discourse.

This October, we explore how AI is reshaping the world of human creativity. In our upcoming Trendspotting session on 23 October 2024, we will explore AI's capabilities in generating 'creative' work and examine its impact on our emotional and intellectual engagement with these works. How do we process and value generative work? Does it challenge or diminish our sense of what is "human" in creativity? As we delve into the latest advancements, we ask: What's the significance of today's debates on AI and creativity? Are we, like our ancestors, gripped by the same age-old paranoia about technology replacing us?

Join us for a thought-provoking discussion as we uncover the truths, myths, and diverse perspectives surrounding AI's role in the creative process. From technologists to artists, cynics to enthusiasts, we'll explore how different viewpoints shape our understanding of AI-generated work and its potential to redefine creativity as we know it.

Suggested Readings

Disclaimer: *The excerpts included in this annotated bibliography are selected solely to facilitate a public discussion and are not intended to represent the full scope of the authors' reasoning or affiliations. Readers are encouraged to refer to the original texts for a comprehensive understanding of the authors' arguments and context. Please note that no views expressed or implied in these texts should be attributed to Hearth Advisors Group or its associates as their professional opinion.*

AI researchers receive the Nobel prize for physics, The Economist, October 8, 2024.

The award, to Geoffrey Hinton and John Hopfield, stretches the definition of the field

"Dr Hinton, … , seemed both proud and worried about his achievements. He mused that by assisting mental labour, generative AI might have as big an effect on society as the industrial revolution's assistance of physical labour has done. But he also fretted, as many in the field do, about how machine intelligence that outstripped the human variety would then go on to treat its creators." Available here.

AI scientists are producing new theories of how the brain learns, The Economist, August 14, 2024.

"…for Dr Hinton, creating better models was never the end goal. His hope was that by developing artificial neural networks that could learn to solve complex problems, light might be shed on how the brain's neural networks do the same…. Working out how the brain does what it does is no easy feat. Much of what neuroscientists understand about human learning comes from experiments on small slices of brain tissue, or handfuls of neurons in a Petri dish. It's often not clear whether living, learning brains work by scaled-up versions of these same

rules, or if something more sophisticated is taking place. Even with modern experimental techniques, wherein neuroscientists track hundreds of neurons at a time in live animals, it is hard to reverse-engineer what is really going on…." Available here.

Arthur Still & Mark d'Inverno, A History of Creativity for Future AI Research, Proceedings of the Seventh International Conference on Computational Creativity, June 2016

The article examines two distinct traditions of creativity: the classical Latin notion of "*creare*" as a natural process of change, and Jerome's Christian interpretation of divine creation from nothing. The authors contend that modern disciplines such as psychology and artificial intelligence (AI) have been predominantly shaped by the latter view, which focuses on individualism and innovation, thereby constraining a broader understanding of creativity across cultures. They propose that the classical view offers a more expansive perspective, one that is relevant to both human and non-Western experiences. By differentiating between these two traditions—G-creative (divine creation) and N-creative (natural development)—the authors aim to clarify current confusion surrounding creativity and advocate for a more comprehensive approach to future AI research. Accessible here.

James C. Kaufman & Ronald A. Beghetto, Beyond Big and Little: The Four C Model of Creativity, American Psychological Association, Review of General Psychology, 2009, Vol. 13, No. 1, 1–12.

"Most investigations of creativity tend to take one of two directions: everyday creativity (also called "little-c"), which can be found in nearly all people, and eminent creativity (also called "Big-C"), which is reserved for the great. In this paper, the authors propose a Four C model of creativity that expands this dichotomy. Specifically, the authors add the idea of "mini-c," creativity inherent in the learning process, and Pro-c, the developmental and effortful progression beyond little-c that represents professional-level expertise in any creative area. The authors include different transitions and gradations of these four dimensions of creativity, and then discuss advantages and examples of the Four C Model." Accessible here.

Mark A. Runco & Garrett J. Jaeger, The Standard Definition of Creativity, Creativity Research Journal, 24(1), 92–96, 2012, Taylor & Francis Group.

"The field of creativity studies has roots in the 1950s, 1940s, and 1930s. Domain differences were examined in the 1930s (e.g., Patrick, 1935, 1937, 1938), and social criteria of creativity relying on consensual agreement go back at least to 1953 (Stein, 1953), just to name two examples.…The standard definition is bipartite: Creativity requires both originality and effectiveness.…Stein (1953) was the first to offer the standard definition in an entirely unambiguous fashion, and unlike his predecessors, he was without a doubt talking about creativity per se.

Stein (1953) "Let us start with a definition. The creative work is a novel work that is accepted as tenable or useful or satisfying by a group in some point in time….By ''novel'' I mean that the creative product did not exist previously in precisely the same form….The extent to which a work is novel depends on the extent to which it deviates from the traditional or the status quo. This may well depend on the nature of the problem that is attacked, the fund of knowledge or experience that exists in the field at the time, and the characteristics of the creative individual and those of the individuals with whom he [or she] is communicating. Often, in studying creativity, we tend to restrict ourselves to a study of the genius because the ''distance'' between what he [or she] has done and what has existed is quite marked....In speaking of creativity, therefore, it is necessary to distinguish between internal and external frames of reference. (pp. 311–312)"" Accessible here.

Hye-Kyung Lee, Rethinking creativity: creative industries, AI and everyday creativity, Media, Culture & Society 2022, Vol. 44(3) 601–612

"This commentary reflects on how creativity is dehumanised (and rehumanised) and how its labour aspects are hindered (and highlighted) in the three recent developments in our understanding of arts, culture and creativity: the creative industries; AI creativity; and creativity in everyday life. The creative industries discourse instrumentalises and dehumanises creativity by hiding labour perspectives and treating creativity as human capital and a generator of IP. Meanwhile, contemplating AI creativity helps us to look beyond the economic paradigm and consider key traits of human creativity and the creation process, some aspects of which are successfully emulated by AI. Yet, we also observe how AI dissociates creativity from human agency and how its cost-cutting effect can challenge human creators in many sectors. Finally, the idea of everyday creativity effectively rehumanises and democratises creativity; however, it not only lacks labour perspectives but also hinders them."
Accessible here.

Dr Paul Atkinson & Dr Richie Barker, AI and the social construction of creativity, Convergence: The International Journal of Research into New Media Technologies 2023, Vol. 29(4) 1054–1069.

"Artificial Intelligence (AI) encroaches on new terrains of human activity by dint of its efficacy and an expanding ability to autonomously incorporate information from many disciplines and sources. In this paper, we focus specifically on how AI affects the communicative practices associated with creativity. AI has the capacity to reshape discipline and taste communities by providing new content that competes with human production and by mediating between human activity and information sources. To frame these issues, we turn to the influential systems model of creativity devised by Mihaly Csikszentmihalyi (1996), which Csikszentmihalyi and Daniel Gruner (2018) recently extended to incorporate AI,

redubbing it Creativity 4.0. The model assesses how AI affects the social structure of creative practice without overly accentuating the similarity between humans and AI, or questioning whether computational devices will replace creative jobs. The paper examines Gruner and Csikszentmihalyi's revised systems model, arguing that it does not sufficiently take into account the variety of ways that AI can be incorporated into creative practice. Prompted by a theoretical reflection on the nature of the model and the emerging features of AI, we propose a new version of the model that highlights how embedded AIs play a key role in filtering and gatekeeping, as well as the importance of generative systems in informing creative practice. We propose that any discussion of AI and the future of creative practice should look at where and how AI-supported technologies are used. We examine how AI can reduce and shape the qualitative diversity of sources of inspiration drawn into the creative process, with the associated technological biases, as well as provide an emergent platform for the development of novel ideas." **Accessible here.**

Weihua Niu Robert Sternberg, Journal of Creative Behavior, Volume 36 Number 4 Fourth Quarter 2002.

"There are two major questions addressed in this article. First, do Asians and Westerners understand the concept of creativity differently? That is, are their implicit theories of creativity different? Second, will studies based on explicit theories show differences in people's creative performance across these two kinds of cultures? Speaking more broadly, is the contemporary concept of creativity universally meaningful, or is it culturally specific?" **Accessible here.**

Lake et al. Building machines that learn and think like people, Behavioral And Brain Sciences (2017), Cambridge University Press.

"Creativity is often thought to be a pinnacle of human intelligence. Chefs design new dishes, musicians write new songs, architects design new buildings, and entrepreneurs start new businesses. Although we are still far from developing AI systems that can tackle these types of tasks, we see compositionality and causality as central to this goal. Many commonplace acts of creativity are combinatorial, meaning they are unexpected combinations of familiar concepts or ideas (Boden 1998; Ward 1994). …In each case, the free combination of parts is not enough on its own: Although compositionality and learning-to-learn can provide the parts for new ideas, causality provides the glue that gives them coherence and purpose." **Accessible here.**