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Deconstructing AI in Artistic Practice

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Abstract

This panel examines the intersections of generative AI with material and installation art practices through three distinct studies, each highlighting a unique dimension of AI's role in contemporary creative processes. The first panellists explore AI's capacity for creating physical sculptures, reflecting on the intricate combination of AI capabilities and human craftsmanship necessary to materialise digital forms into physical sculptures. The second one investigates how textile and fashion designers integrate generative AI into creative workflows, revealing a gap between digital outputs and the tangible realities of material-based design, which calls for novel tools and methods. And the final panelist delves into "Language Is Leaving Me," a cinematic AI installation that critiques AI's inability to fully capture cultural and epigenetic memory, drawing attention to biases in large language models. Collectively, these studies emphasize AI's potential and limitations in artistic practices, underscoring the critical need for human oversight and creative intervention to bridge digital outputs with physical, cultural, and affective dimensions in diverse material contexts.

Keywords

creative AI, critical AI, material-based practice, textiles, fashion, sculpture, performance, 3D print, epigenetic trauma, AI cinema

Introduction

Integrating generative AI into creative practices has opened new avenues for artists to explore form, materiality, and expression. Yet, it also raises questions about these systems' limitations, biases, and opaque nature. This paper presents three case studies that "lift the curtain" on the inner workings of AI in art, exploring how artists not only use these tools but also critically interrogate their construction, functionality, and constraints. We aim to deepen and share our understanding of how artists mould these technologies within their practices by examining different AI-based projects across sculpture, textile design, and multimedia installation.

One crucial aspect of this exploration is deconstructing the technology itself, examining how it is built, why it is designed in specific ways, and how it behaves under various conditions and inputs. For instance, Huang and Guljajeva discuss in their paper how artistic insights can emerge from AI's failures or limitations in training processes, providing valuable perspectives on the inner mechanics of these models and their potential for artistic deployment. [1] Additionally, awareness of the environmental impact of AI-driven practices, such as the significant CO_2 emissions produced by training deep learning models on NVIDIA GPUs, as noted by Kyle McDonald[1], underscores the broader implications of AI's integration into artistic workflows.

The projects in this panel collectively reveal how artists navigate the technical and conceptual challenges of working with AI, often needing to customise or create alternative solutions to adapt these commercially available tools to meet their aesthetic goals. While these tools offer potent capabilities, they frequently impose restrictive presets, filters, and locked workflows that can constrain creative expression, locking users into specific aesthetics or processes. This lack of flexibility highlights the need for open-source alternatives that would allow artists more freedom to modify, extend, and repurpose AI models in ways that align with their unique practices.

As AI becomes increasingly embedded in diverse strands of artistic practice, artists need to have not only access to these tools but also the ability to meaningfully engage with and influence their development. The case studies discussed here illustrate how artists are pioneering unique techniques and methods to overcome the challenges posed by current AI models, advocating for systems that are both accessible and adaptable to the diverse needs of the creative community. By lifting the curtain on these projects, this paper aims to reveal the complexities and innovations of AI-driven artistry, encouraging a future in which artists actively participate in shaping the technologies that influence their work and expression.

[1]https://github.com/kylemcdonald/nvidia-co2

Varvara Guljajeva and Mar Canet Sola: In Search of Form and Materiality

In late 2021, we commenced a project to generate 3D objects with AI, a straightforward task that proved to be far more complex than anticipated. At that time, available models created the illusion of 3D rather than generating 3D models that could be digitally refined and fabricated.[2]

As we documented previously, most of these models produced panoramic views based on input images and outputted flat image files.[3] Others were limited to rendering a single object type, such as birds and chairs. Our empirical research identified that the Text2Mesh[2] model held the potential for realizing our artistic concepts. However, this model remained aspirational in its ability to generate an accurate 3D object file solely from a text prompt. Instead, the model required a 3D model and text input stylized by neural networks. Through extensive trial and error, we identified which objects and prompts yielded the most coherent results. Notably, these generated objects lacked an understanding of physical constraints, like gravity, requiring significant digital intervention and modification on our part. Subsequently, we refined the forms by hand, 3D printing them in clay and subjecting them to transformative processes of fire and glaze (see Fig.1). Despite these limitations, we created 40cm-tall ceramic sculptures with colour palettes and contours beyond traditional manual techniques. Our inaugural AI-assisted sculpture, Psychedelic Angel, stands 1.5 meters tall and is crafted from recycled plastic. The resulting series, Psychedelic Forms[3], references the uncharted journey that generative AI has taken us on.

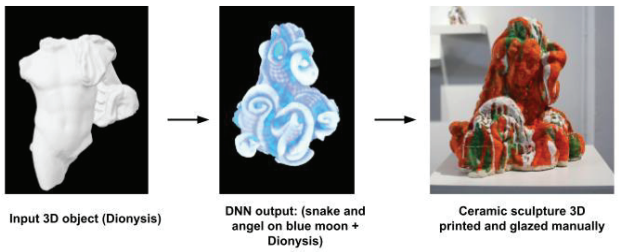

Figure 1. A pipeline of AI-aided ceramic sculptures.

Two years later, in August 2023, we produced a second sculpture using a newer generative AI model. This time, DreamFusion[4] offered the potential for genuine text-to-3D generation, outputting object files directly. Yet, even with this advancement, few results were manufacturable. The generated shapes were often incomplete or incompatible with fabrication processes. After experimenting with various prompts, it became evident that AI could only create a limited range of coherent 3D shapes from basic prompts, one of which was a "cloud".

Our concept involved sculpting human hands and suspending a cloud—a metaphor for the coined term by Jeff Bezos himself, "artificial artificial intelligence," which exists only due to the unseen human labour behind AI models. Since DreamFusion struggled with generating hands, instead we scanned our own hands, scaled them, and 3D-printed them. The cloud was created using DreamFusion, scaled, repaired, split in half, and printed in clay (Fig. 2).[4] Due to the complexity of the form, the final piece required structural infill for stability.

This process shows the distinction between AI-aided and AI-created artwork. As discussed in earlier studies, using AI requires understanding and elaborate processes when creating meaningful artworks.[5][6] The neural networks served as catalysts in our process, prompting extended hours of refinement and active artistic decision-making, consistent with traditional creative practice. The resulting sculptures thus remain a testament to the collaboration between human ingenuity and machine potential.

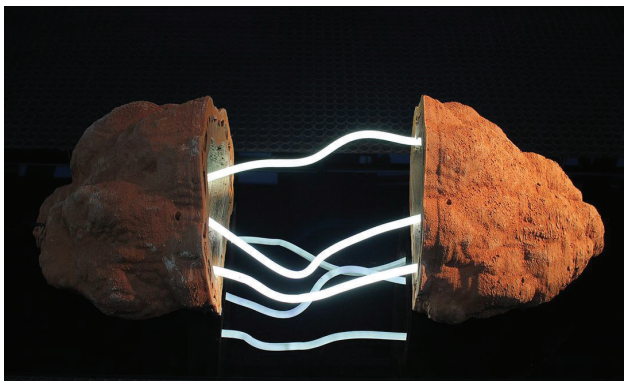

Figure 2. Beneath the Cloud (2023).

Erin Lewis: Generative AI and Material Practice: Rethinking Process, Methods, and Tools in Textile and Fashion Design

In recent years, several generative AI text-to-image models became publicly accessible for the first time, quickly capturing the attention of diverse artistic fields. [7][8][9] These models are relatively simple to use and produce impressive, high-quality images based on natural language descriptions in mere seconds. While textile and fashion designers saw potential in these tools for ideation and concept generation, they also noted limitations: these models needed to be trained for the specialized textile and garment design processes, which rely heavily on material, structural, and formal elements. Although these tools can be useful for initial sketching, translating the digital images into the tactile, tangible world of textiles and fashion requires significant transformation, and their integration

[2] https://threedle.github.io/text2mesh/
[3] https://var-mar.info/psychedelic-forms/
[4] https://dreamfusion3d.github.io/

into such material workflows remains underexplored [10]. This disconnect raises an opportunity: by studying how artists and designers across fields are adapting and bridging the gap between AI tools and material practices, new methods or tools might emerge that better align with textile and fashion workflows. Yet, without input from artists, these tools may continue to lack features essential for effective integration in material practices. [11]

The conscious and critical adoption of digital technologies enables designers to create complex patterns and garments previously unachievable through traditional methods. These technologies have primarily focused on 3D design, virtual reality, and augmented reality, but consumer-accessible AI introduces new questions about authenticity, aesthetics, novelty, and artistic process. [12] This shift emphasizes the need for practice-based theories that address these emerging challenges. [13]

AI models produce output through recursive computational layers, creating an "abstract, multidimensional, and latent space" [13, ibid.], capable of generating diverse variations of training data. This allows for gradual interpolation between design elements, [14] enabling textile and fashion designers to create unique, unpredictable structures, patterns, and combinations. By analyzing large datasets, AI can generate new designs influenced by user input, which enables a focus on specific aesthetic qualities and results in distinctive textiles and garments that transcend conventional design methods.

Figure 3. AI imagery digitally printed on textiles by Liana Paberza (Image credit: Liana Paberza, 2023)

In this panel discussion, Erin Lewis will discuss how textile and fashion designers have approached using generative AI in their practice despite the limitations of consumer-accessible tools for material-based practices. To illustrate this, Lewis will present and discuss a series of exploratory artistic works (such as Figs. 3 & 4) that highlight novel approaches to working with generative AI tools. Critical to the discussion will be the limitations of such tools, and what more is needed from artists and designers working hands-on in these fields. Lewis suggests that new processes, methods, and techniques are required for textile and fashion designers to reap the benefits of this class of technological tools fully.

Figure 4. Knitted textile designs (left) inspired by AI design (right) by Carolina Sardal Jerhov (Image credit: Carolina Sardal Jerhov, 2023)

Ellen Pearlman: Language Is Leaving Me: An AI Cinematic Opera of The Skin

Language Is Leaving Me – An AI Cinematic Opera Of The Skin, (LILM) focuses on AI, algorithms, a sonic environment, and biometrics through the lens of epigenetic, or inherited traumatic memories of cultures of diaspora.

Embedded tagging systems commonly referred to as Large Language Models (LLM) emerged around 2017 built on transformer neural network models that learn context or pattern recognition to understand predictive models of sequential data.[15] Epigenetics in my visual and performative work is understood to mean chromosome modifications that are not part of DNA structures, and more specifically its rDNA.[16] Intergenerational trauma is often non-verbal, cryptic, and difficult to decipher. It is not definitively proven that human psychological trauma can change chromosomal rDNA, much less human behaviour. LILM used different linguistic prompts or texts translated from English into Yiddish, Chinese, Tamil, and Xhosa cursive scripts to reveal hidden and devastating aspects of the multilingual algorithmic processes underlying AI perception and cognition. I created a short video consisting of original and archival footage of my memory of an epigenetic traumatic incident I experienced to use as training data. The open-source visual text-to-image model Stable Diffusion was released by Stability.ai in 2022 drawing on data sets from the LAION 5-B Latent Diffusion image bank created by the German charity LAION.

I conducted a series of tests in Stable Diffusion using the English language Google translation of my film's narration into four cursive scripts: Yiddish (my ancestral tongue), Chinese, Tamil, and Xhosa. I wanted to see how cursive non-English scripts would function as text prompts and batch image-to-image comparisons using the then newly released (2022) AUTOMATIC 1111, a web-based graphical user interface. Dividing my original LILM movie into 57 scenes, each scene was further subdivided into individual .jpg files through a Split-To-Frames converter

rendering 50-200 .jpgs per scene. This meant I had four different folders to batch process through Automatic 1111: Chinese, Yiddish, Tamil and Xhosa, each containing fifty-seven scenes adding up to 228 folders of foreign language .jpgs to produce a five-minute movie. The .jpgs were turned back into an MP4 video using a customised FFMPG script and edited into a collaged master video that displayed sections of the original film next to scenes from the translated films. I saw that multi-lingual meaning in the age of algorithmic smoothing and machine learning fosters semantic taxonomies skewering interpretations of images. Referred to as the 'epistemics of training sets" it is the fraught and complex relation between images and the concepts that tie those images to their linguistic meaning. [17] This can also be described as "catastrophic forgetting" or excluding entire cultural histories and contexts. Epistemic AI attempts to create new mathematical models for decision making assuming it has a paucity of data from which to make any sort of conclusion. Only since 2016 has the issue of epistemic uncertainty in machine language become an area of focus.

Figure 5. English (right) "Four years after the war they started to dig them out", Chinese (left), 战后四年，他们开始把它们全部挖出来.

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