



What Got Us Here, Won't Get Us There

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The Potential Influence of Artificial Intelligence Within the Design Process

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Abstract: This short reflection examines the similarities between AI generated image systems (DALL-E 2, Midjourney and Stable Diffusion for example) and the creative process employed by designers and artists. It challenges the notion that AI cannot produce art or design that could be considered 'original' or 'creative', by examining the (often) derivative nature of the creative process, (where influence and mimicry play a significant role) and comparing it with the way AI image generators use existing visual data. It concludes that AI image generators are likely to play a significant role within the design process due to their increasing capabilities (multi-model input and use of large data sets), as well as the consumer's appetite for novel but familiar design.

Keywords: AI, Creativity, DALL-E 2, Vizcom

In recent months AI image generators such as DALL-E 2, Stable Diffusion and Midjourney have garnered much attention due to their ability to generate images based on a text prompt. They are capable of generating unlimited unique images with a high level of photorealism, or that can mimic particular well-known styles. The examples below have been generated using Midjourney using the text prompts, "A photograph of a cat baking bread in the 1970s, Agfa, 35mm" and "A painting of Tom Cruise by Rembrandt" (Figure 1 and Figure 2):



Figure 1. An image generated using Midjourney using the prompt “A photograph of a cat baking bread in the 1970s, Agfa, 35mm” (Lewis, 2023a).



Figure 2. An image generated using Midjourney using the prompt “A painting of Tom Cruise by Rembrandt” (Lewis, 2023b).

Their use has been met with a range of reactions from astonishment to outrage, with some applauding their capabilities, such as artist Alexander Reben suggesting, "...we are on the cusp of a new artistic movement, and I view these tools as the beginning of the next great period of creative expression" (Reben, 2022), and others expressing grave concerns, describing AI generated artwork (for a prototype computer game) as "a slurry of real people's artwork." (Lichfield, 2023). This last comment in particular highlights the issue that image generators are trained on millions of existing images, including photographs and artwork. The fact that they derive images from those that already exist could lead one to question how 'creative' they are, or whether they can be used in the design process to achieve creative results.

Creativity is a key skill within Art and Design and many artists and designers would argue that artistic creativity is uniquely human, almost spiritual and therefore beyond the capability of computers. Philosopher John Hospers discusses the process of artistic creativity, citing Wordsworth's assertion that "poetry is the overflow of powerful feelings" and dismissing the theory that artistic creation is a type of problem-solving (using the examples of Mozart and Houseman, neither of whom could specify from whence their creativity originated, other than inspiration arriving during a 'walk' or after a 'pint of beer' (Hospers, 1985)). On the surface, it would appear that the creative process is therefore something intangible, deriving from the subconscious. However, with AI generated images increasingly being described as 'art' or 'design', it is worth discussing what we mean by 'creative' and the 'creative process', and whether it can be mimicked by AI.

In Alf Rhen and Christian De Cock's 'Deconstruction of Creativity', they first suggest the popular perception of being creative "involves the ability to come up with something 'new' which is of 'value' or 'useful'" (De Cock, 2009). However, they contest the value of 'novelty' by citing the works of Duchamp and Oldenburg who re-used and recontextualised existing objects: "for them, there was no original, only an endless chain of derivatives". De Cock references Cezanne's obsession with painting Mont Saint Victoire, to "challenge the notion that creativity by necessity must contain original properties...copying, imitation and mimicry, not to mention just hard (re)productive work can be just as important". In 'The Death of the Author', Roland Barthes (1967) suggests that writing is "a tissue of quotations drawn from the innumerable centres of culture", challenging the idea of the author (and perhaps artist) as the single source of an original artwork. Popular music of the late 20th century onwards, with its cover-versions, remixes, samples (and accompanying lawsuits) is a contemporary example of everyday re-use, imitation and mimicry.

The notion of 'style' too, suggests that creatives mimic the work of others even if their own work is considered original. The history of art and design often groups artists and designers that are identifiable by similar methods or visual outcomes, from Egyptian wall carvings to Art Nouveau, from the Impressionists to manga comics. Although methods and subjects may differ, and artists and designers are distinguishable within a group, 'styles' (among other traits) often allow us to define the group. Whether we call it influence or mimicry, it's clear that artists and designers copy the work of others to some degree, whether they can explain their process in great detail, or whether it just 'flows' from them. It could be argued that AI image generators, by processing existing images of art and design and generating new images as a result, mimic our own art and design process.

Where aesthetics is concerned, the idea that 'beauty is in the eye of the beholder' belies the fact that a consensus has arguably formed as to what makes something pleasing to the eye. 'The Rule of Thirds', 'The Golden Ratio' and Le Corbusier's 'Modulor' (Corbusier, 1958) are but a few examples of 'design rules' taught and used by designers the world over to enhance the quality of a design, and owe as much to mathematics as to instinct. This idea in particular begs the question as to whether these rules can be applied algorithmically via new AI enabled design software. AI may not 'know' if something is beautiful, but it may apply (at least some of) the parameters that makes it so.

It could be argued that AI generated images are subject to the 'GIGO' phenomenon, meaning 'Garbage In Garbage Out' (Daintith et al 2008), whereby an algorithm's output is only as good as its input data. DALL-E 2's developer, Open AI, have made reference to potential errors in their own system which could cause anomalous results (Open AI, n.d.). Although these image generators often fail in their attempts to create suitable images (Figure 5), that does not mean that they are all 'garbage'. There are many examples of images deemed good enough to be used commercially, from backgrounds in animations (Jiang, 2023) to AI generated photographs published in photographic magazines which were thought to be real (Growcoot, 2023). The idea that all designs and images will be derivative due to copying pre-existing data does not consider the cross-fertilization of the image data on which they are trained. For example, a dress design generated in DALL-E 2 is not restricted to a dataset solely derived from pre-existing dresses. Instead, data can be drawn from any image, such as the dress below, created with the prompt, "a photograph of an 18th century French ballgown in the style of a seashell" (Figure 3). The design itself may not be considered ground-breaking, but does demonstrate AI's ability to combine visual data from seemingly unrelated subjects in order to create something new. This method of cross-fertilization of visual data mimics that of many artists and designers, and is evident across art and design, from Gaudi's Sagrada Familia, with its columns inspired by sequoia trunks (Helmy et al, 2020), to the floral decoration of the Arts and Crafts movement.



Figure 3. Image produced in DALL-E 2 using the text prompt "a photograph of an 18th century French ballgown in the style of a seashell" (Lewis, 2023c).

The AI generated dress design may not be regarded as particularly original, but as the fashion industry demonstrates, the vast majority of designs available to consumers are derivatives, from the ubiquitous t-shirt and jeans to hi-top trainers (Figure 4), and AI is already being used to design outfits (Tang, 2023).



Figure 4. Image produced in Midjourney with the text prompt “A photograph of Nike Hi-Top sneakers in an art Art Nouveau style” (Lewis, 2023d).

If text-to-image generators are limited in that ‘a picture tells a thousand words’, so it follows that a complex or nuanced image would require a thousand words or more to describe it, and therefore may be beyond the capabilities of current systems. However, these systems often allow the user to start with an image in conjunction with a text prompt and allow ‘in-painting’ (Figure 5) and ‘out-painting’ (Figure 6) - the process of rubbing out an area of an image and prompting AI to refill it based on a text prompt and the remainder of the image (DALL-E 2). Vizcom (2023) have developed software that interprets lighting and three-dimensional surfaces from a drawing (Figure 7), thus saving time shading and rendering. Many of these ‘multi-modal’ approaches are in development, including Meta AI’s ‘Make-a-Scene’ system (Meta AI, 2022) wherein the user can upload a sketch with a text prompt. Open AI’s text-to-3D model system called ‘Point-E’ (Wiggers, 2022) can create 3D models from text prompts, whilst NVIDIA has developed a system that can produce unlimited 3D models for populating virtual worlds (Salian, 2022). Although critics of AI generated images note the obvious errors in depicting hands in initial releases, the latest GPT4-enabled Midjourney appears to have improved in this area (Verma, 2023). The speed with which these systems have evolved and proliferated (thanks in large part to the open-source nature of the software (The Economist, 2023) would suggest many of these issues can be resolved in time.



Figure 5. This image shows an example of ‘in-painting’, whereby the original image (top left), had areas erased (bottom left), which were then completed by AI (DALL-E 2). Note the errors in attempting ‘bowler hats’, but success in depicting ‘top hats’ (Lewis, 2022e).

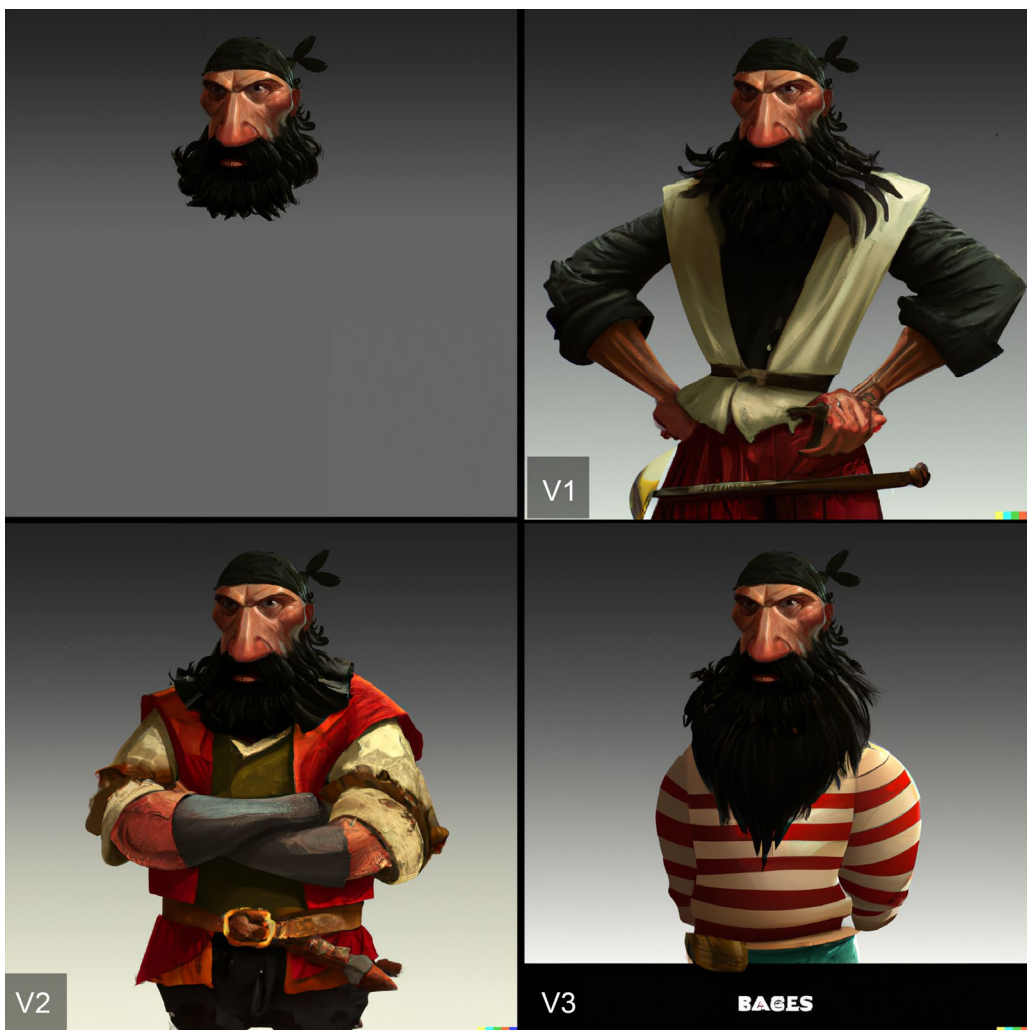


Figure 6. This image shows an example of ‘out-painting’, whereby the original image (top left), has been completed by AI (DALL-E 2) (Lewis, 2022f).

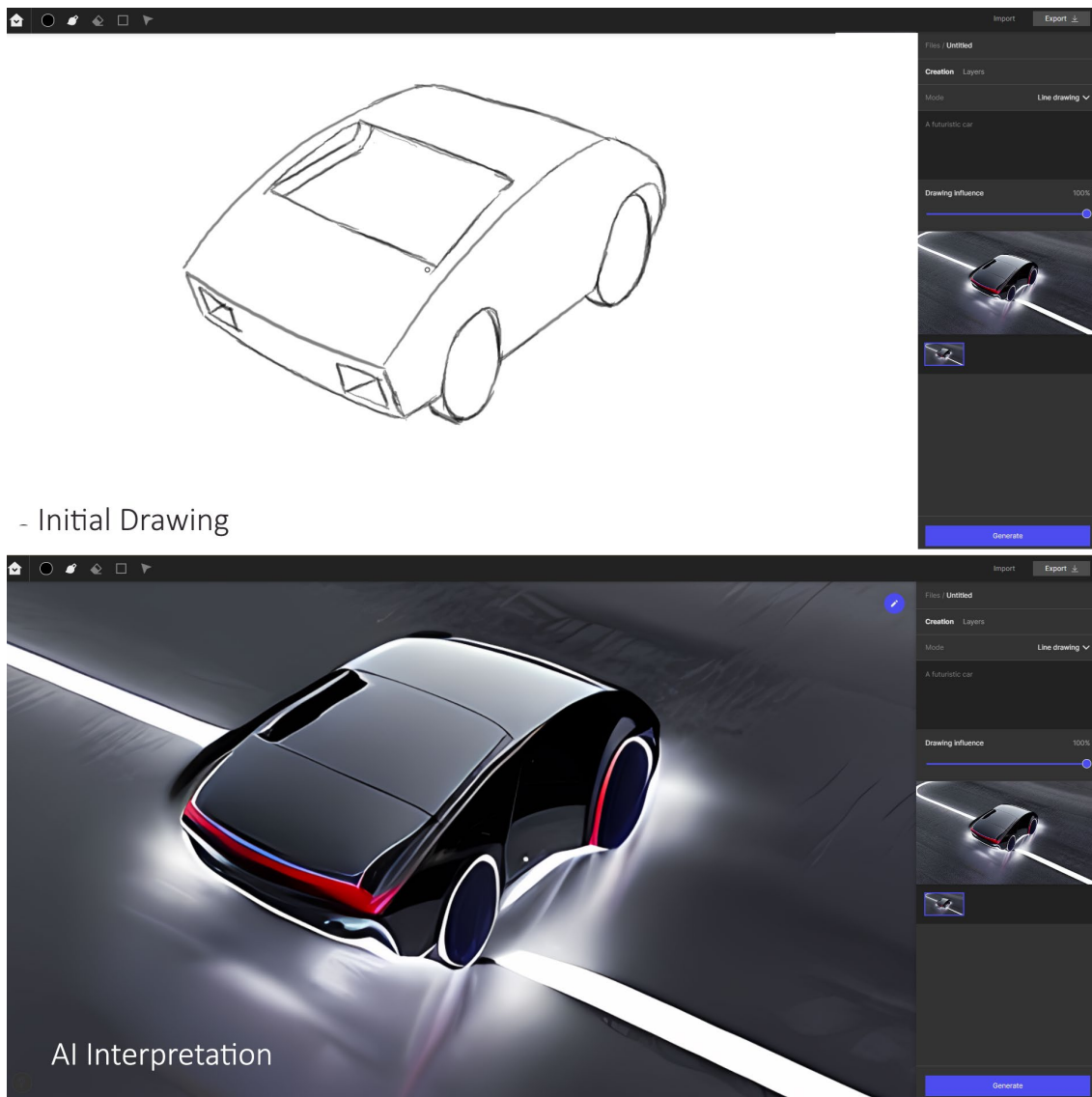


Figure 7. A drawing interpreted by Vizcom.ai software using the prompt “A futuristic car”, (Lewis, 2022g).

To many, the so-called power of AI generated images may be a moot point given the issues around the copyright used in training image generators. Getty Images are currently suing Stability AI for using its images in its dataset (Brittain, 2023), and recent guidance from the US Copyright Office states that images generated from a text prompt are not regarded as ‘the product of human creativity’ (Federal Register, 2023), therefore cannot be covered by copyright without significant alteration by a human. It is though unlikely that AI image generation will be banned, or research halted; one reason being the huge investment by many corporations in AI research, not least Microsoft’s multibillion dollar investment in Open AI (Milmo, 2023). The process of generating images may be modified by court ruling (via restriction on images used in datasets, for example), but it’s unlikely it will be stopped. It should also be considered that even if ‘illegal’ datasets (those including images without the user’s permission) are used as part of the design process, who could prove the end-result was down to a specific image in a dataset? This is perhaps why AI image generators are already used at the ideation stage by Zaha Hadid Architects (Bah, 2023). Furthermore, the game developer and publisher, Blizzard has created an AI tool (Blizzard Diffusion), that draws on its back-catalogue of artwork to create new designs (Kerr, 2023), thus avoiding issues around copyright and ownership. The use of AI is not only limited to early 2D ideation. Autodesk’s Fusion 360 Generative Design tool enables users to generate multiple 3D product designs suitable for manufacture, albeit with user oversight and iteration (Autodesk, 2023).

To summarise, the human creative process is perhaps more derivative than it would first appear, with the history of art and design replete with examples of re-use, re-contextualisation, influence and mimicry. Conversely, AI image generation has the potential to be less derivative due to its cross-fertilisation of datasets, multimodal inputs and specialised software. Consumer preference for design that is novel but still familiar (as in the case of fashion design), will provide a space for AI enabled design to flourish. Early indicators show that AI is being used at multiple stages of the design process, from early ideation using widely available tools like Midjourney, Stable Diffusion and DALL-E 2, to tools developed specifically for a company or process, such as Blizzard Diffusion and Fusion 360 Generative Design Extension. It is therefore highly likely AI will be increasingly incorporated into the design process from concept to completion.

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Nicholas Lewis has worked in the Games and Animation industry for over twenty years, covering roles from 3D artist and animator to Art Manager. This experience informs his academic role alongside research into current and future methods of creative practice.

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