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ABSTRACT

Artificial Intelligence (AI) has rapidly evolved and transformed various industries. This article explores the applications, impact and ongoing debate of AI specifically in the creative industry. Also, the article raises concerns about AI replacing human creators and the ownership and authorship of AI-generated content.

Despite these concerns, the authors advocate for a collaborative approach, with AI enhancing specific creative aspects and enabling humans to focus on more intricate, transformational elements. Indeed, it is time for a revaluation of creativity, urging the embrace of AI as a companion in the creative industry.

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RETHINKING CREATIVITY: AI IN ARTISTIC EXPRESSION

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Introduction: The use of AI in creative works

In recent years, Artificial Intelligence (AI) has rapidly evolved from a subject of science fiction films to an integral part of everyday life. It has transformed various industries, including healthcare, finance, entertainment, and transportation. A fascinating and possibly understudied area of AI is its collaboration with human creativity. AI tools are being used more and more by artists, musicians, and writers to enhance their work, streamline processes, and explore new artistic frontiers.

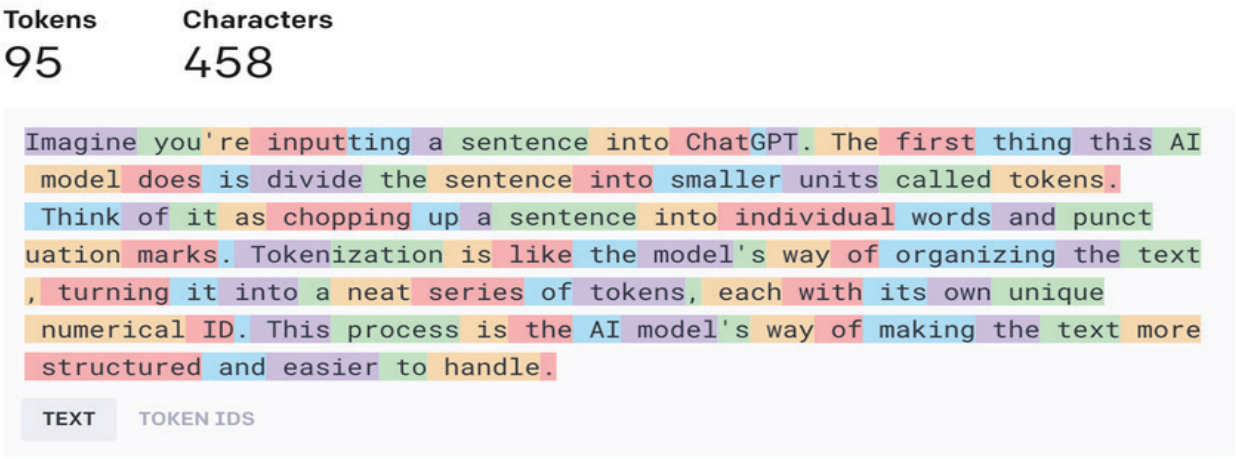
The emergence of AI in the creative realm is not without controversy. While many are excited to explore AI's creative potential, which allows everyone to produce various forms of creative works, many have raised ethical concerns over its ability to mimic, or worse, replace human creativity. Sceptics argue that AI's forays into the arts could signal the end of human creativity and lead to a time when machines take the place of artists. Optimists, on the other hand, see AI as a powerful tool that can complement and amplify human creativity. The truth, as it often does, is likely to be somewhere in between.

This article will first explain the fundamentals of Generative AI which uses AI in creative works. It will then discuss the debate over creative AI.

The building blocks of Creative AI

There are three basic building blocks to generative AI that are used in creative works: “Text2Text”, “Image2Image” and “Text2Image”.

“Text2Text AI” models like ChatGPT, QuillBot, and WriteSonic, hinge on ‘tokens’ – units that can be words, partial words, or single characters. Text is first converted into tokens, and are subsequently processed and analysed. Let’s consider how it works in the next paragraph.



After tokenisation comes ‘embedding’, where each token becomes a high-dimensional vector that represents the token's meaning. Then, contextual analysis happens as the AI model processes tokens sequentially, much like how a human read word by word. The model employs artificial neurons and interconnected layers to understand relationships, identify patterns, and predict token sequences. Next comes the fun part, namely ‘generation’, where the model predicts the next token based on context and selects the most likely one, continuing this process until a full sentence or paragraph is formed. Finally, ‘detokenisation’ brings the tokens back to human-readable text.

So, what is the purported “magic” behind AI models like ChatGPT? It is their ability to swiftly process massive volumes of text data. They learn to recognise the patterns and nuances that make up human language, allowing them to generate coherent, contextually relevant, and surprisingly human-like texts – a testament to the power and potential of machine learning.

Figure 1: *Example of diffusion process*

"Image2Image", as the name suggests, involves transforming one image into another. It is not just about applying filters or adjusting brightness and contrast; it is about fundamentally altering the contents of an image, creating or modifying its elements, or even generating entirely new images from scratch. Among the plethora of techniques available for image transformation, Stable Diffusion stands out for its effectiveness and versatility.

Drawing inspiration from the phenomenon of diffusion observed in physics and chemistry, it injects controlled noise into the original image, much like adding unexpected colour to a canvas, leading to creative possibilities. Next, the model undergoes 'iterative diffusion', which is comparable to ink dispersing in water. It redistributes pixel values, reshaping the image in a high-dimensional latent space (Figure 1). In this high-dimensional space, the model can manipulate the image's essence like a sculptor. "Reconstruction", translates the transformed latent space into a unique image. It is the culmination of the creative process, akin to the final brushstrokes of a painter, revealing a unique and transformed image.

The final building block, "Text2Image", is a method for creating visual representations from textual descriptions that borrows ideas from "Text2Text" and "Image2Image" models. Tokenisation and embedding capture semantic meaning of the words and provide a basis for the AI model to understand the relationships between them. Here, the AI model makes use of multiple layers of artificial neurons that resembles human brains to provide contextual analysis that takes into account the relationship between the text and visual elements, recognising patterns and forecasting visual elements. In the next step, generation, iterative redistribution of pixel values, namely the diffusion process is guided by the contextual analysis to create a visual representation in the latent space after a controlled noise is introduced into a canvas. Finally, reconstruction transforms the latent space back into a tangible image, bringing the textual description to life.

What is creativity?

Before we delve into the debate around creative AI, let us pause and consider what exactly is creativity? While it is an elusive concept, we will discuss it using the debate around creativity and originality. Cognitive scientist Margaret Boden defines creativity as "the ability to come up with ideas or artefacts that are new, surprising, and valuable"[1] in her insightful book on human creativity and AI. In the same writing, she suggests three main forms of creativity, namely:

i) 'Combinational creativity': the process of combining existing ideas to come up with something new.
ii) 'Exploratory creativity': the process of creating new ideas within a predefined conceptual space.
iii) 'Transformational creativity': the act of ignoring fundamental conventions to conceive potentially impossible but highly creative ideas.

Furthermore, she suggests that approximately 95% of professional artists and scientists' endeavours fall into either the exploratory or combinational categories, while the remaining 5% represents transformational creativity[2]. Arguably, the first two forms are the most at risk of being replaced by AI. Given sufficient relevant data and parameters, AI can produce new combinations of existing ideas within a set framework as much as you need it to. Certain AI systems have the ability to propose modifications to the structure, thereby expanding the realm of creative exploration.

Who owns the work?

With the rapid rise in creative AI, one of the top concerns are that AI will eventually replacing humans in the creative industry. The rapid production of content by inexpensive AI tools raises serious concerns about the potential decline in need for human labour in the creative sector. Labour union, the Writers Guild of America, recently went on a 146-day strike against AI tools for content creation and the use of AI-generated content as source material.

The strike ended in September 2023 after reaching an agreement that included terms that would protect writers from pay cuts or job displacement from generative AI usage and prevent AI training on their writers' work[3].

The strike is over, but the discussion of AI's impact on the creative industry is probably far from over. Ownership disputes over AI-generated works can arise, as exemplified by Stephen Thaler's AI art case. Thaler had developed an algorithm called Creativity Machine, which produced an AI-generated image that he tried to copyright. However, the US Copyright Office repeatedly denied his requests to copyright the image "as a work-for-hire to the owner of the Creativity Machine," wherein the AI algorithm would be listed as the author and Thaler as the artwork's owner. Thaler sued, but the court ruled against him, emphasising the need for human authorship as a fundamental requirement of copyright.

Large datasets, many of which contain copyrighted content, are used to train AI models. Consequently, there is a risk that AI-generated content may unintentionally replicate or closely resemble existing works, raising concern over intellectual property. Allegations were raised regarding the GitHub Copilot tool in another instance, stating that the tool was reproducing code snippets without software developers' consent, thus violating their copyrights. Another lawsuit by programmer and lawyer Matthew Butterick alleges that data scraping by Microsoft, GitHub, and OpenAI amounted to software piracy.

These cases exemplify two of the many challenges of determining ownership and authorship for AI-generated content. As AI becomes integral to creative works, it raises questions about creator identity. As such, the legal framework for copyright may need to evolve to address the unique issues posed by AI-generated works.

To resist or to work with the machine?

Amidst these divisive concerns, it is undeniable that AI advancement is imminent, and the technology will only get more sophisticated. This tension around intellectual property therefore underscores the need to comprehend AI mechanisms. For example, the input-output relationship in AI creation, exemplified by specifying artists like "Monet" for a distinct style, highlights the agency retained by human creators in shaping AI-generated outcomes. When creatives recognise this interplay and the dynamics of AI, the question now shifts from 'how to resist' to 'how do we work with this?'.

In fact, some optimistic industrial players argue that worries about AI replacing artists arise from a misguided view of the creative process. Humans give their work meaning, so creativity should not be seen as something two-dimensional. AI's ability to discern patterns and reproduce them at top speed allows it to help artists explore 'combinational and exploratory creativity' in their work. 'Transformational creativity', however, calls for complex ideas like memory, thoughts, emotions, that only humans can fully understand and conceive. There is now space for creative professionals to delegate exploratory or combinational creativities to AI and focus on their transformational creativity.

The use cases for such delegation are enormous. One of the most significant advancements for visual creatives is AI-driven image enhancement, which automates adjustments like lighting, contrast, and colour balance, saving time for photographers and artists. Professionals can use this to quickly edit hundreds of images, freeing up their creativity for image curation and art direction.

With "Text2Image" and "Image2Image" AI, generative art can provide digital artists with original visuals inspired by text or pre-existing images. Artists can then come up with fresher, more inventive concepts, such as crafting mythical creatures based on descriptions or honing sketches. Style transfer merges one image's style with another's content, enabling diverse visual experiments. For example, it can apply Van Gogh's style to a cityscape photo or unify promotional materials for a consistent look.

For writers, AI writing assistants provides writers with real-time feedback and grammar checks. Grammarly – the AI writing assistance tool – for example, detects errors, suggests synonyms, and offers style advice, especially helpful under tight deadlines. Automated content generation with Text2Text AI, exemplified by GPT-4, aids writers in brainstorming, outlining, or even drafting articles. Meanwhile, sentiment analysis tools like MonkeyLearn or IBM Watson help writers understand the emotional tone of their text, ensuring their message resonates with readers.

Conclusion: Embracing AI as a companion on our creative journey

This evolution of creativity through AI calls for a reevaluation of our understanding of authenticity, authorship, and the emotional connections we forge with art. The collaboration between human ingenuity and machine intelligence encourages a rethink on the definition of creativity, forcing us to reconsider the definition of creativity, emphasising the importance of comprehending the creative process as well as the creative output.

As we venture into uncharted creative realms with AI, we must do away with the “black-and-white” type of narratives that have constrained our perception of human creativity's potential. AI's emergence as a catalyst need not be seen as a devaluation of human intelligence, but rather a transformative force that challenges us to broaden our horizons and reshape the landscape of creativity in the digital age. Let us not fear the rise of the machine but celebrate its role as an inspiring companion on our artistic voyage, and serves as a constant reminder that human and artificial creativity have no boundaries.

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