



Architect, AI and the maximiser scenario

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Recently, I had the opportunity to attend an exhibition titled 'AI-driven Architecture - A Curated Presentation'. The poster works featured hypnotic forms iterated in many configurations with stunningly beautiful AI-generated 3D images of apartment renderings. Notably, some projects were explicit attempts at synthesis, drawing from vast online sources of machine-learned images.

I was intrigued when my students inquired about my impressions of the event. What struck me was the absence of typical architectural investigative components, such as considerations related to users, site, context, sustainability, apartment layouts, and building sections, in the exhibition's approximately 20 posters. This exhibition, however, marked an exciting shift in architectural posters, as the crowd buzzed with discussions about DALL-E and Midjourney, AI image generators. Conventional productivity digital tools like CAD and even the more contemporary Building Information Modeling (BIM), which are crucial for layouts and performance, appear to have lost their shine. I found myself in a rather perplexing situation, struggling to find a response, particularly when it became clear that the production of hyper-real generative images required considerably less time than the actual printing of the posters. The last poster featuring a pine cone inspired apartment building left me deeply contemplative and somewhat skeptical about harnessing the immense capabilities of AI image generation with such a singular and specific visual purpose.

For architects, digital tools have been steadily evolving, but the rapid emergence of AI is a historical turning point, shifting architectural representation from physical models to hyper-real digital renderings. As someone with two decades of practice, I wriggled to mentally transform the pine-cone-inspired human habitat (a biomimetic omnidirectional form not seen in the hot arid climate of the Middle East)

into buildable schematics. I was thinking about how AI is used in practice and architectural studios today and how fast the entire architectural community and media have become hyped about the 'new kid on the block'. Even established firms like Zaha Hadid's ZHA proudly declare their use of image generators like Midjourney to churn out conceptual options aligned with Zaha's distinctive style and to create mood boards that quickly captivate clients. The ability of AI to fabricate to-be-built buildings or parts (like interiors and landscapes) with highly convincing representations makes one ponder whether society has reached a point where reality is virtually indistinguishable from its simulations, akin to Boudilard's (1994) hyper-real spectacle.

It seems that, based on recent advancements, AI technology is increasingly regarded as a boon to early concept brainstorming as in the pine cone case. Now, in a hypothetical scenario where architects fully entrust AI to maximise architectural design—with 'aesthetics' as the main focus—without human judgment for other factors, the unchecked AI may lead to undesirable, unsustainable, or even destructive architectural outcomes, much like Nick Bostrom's (original version 2003; 2020) Paperclip Maximiser scenario. There are other critical issues as well that are important to explore during this shift. Like the ethics of prioritizing hyper-realism over the well-being and functionality of architectural spaces and balancing the allure of mesmerizing images with the responsibility of designing spaces that serve their intended purpose. And there is the overarching ethical question of authenticity. Let us delve into Midjourney here. Midjourney (surfaced in 2022) uses a technique called "Generative Adversarial Networks" (GANs) to create its images. GANs are now at the forefront of creating hyper-realistic visuals and simulations. They are a type of artificial intelligence that can learn to generate realistic images using G/Generator and D/Discriminator networks. The training of GANs is framed as a minimax game where the generator and discriminator are in a constant battle. The generator aims to produce data that can fool the discriminator into categorizing it as real, while the discriminator strives to improve its ability to distinguish real from fake data. It is a very sophisticated,

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evolving intelligence that is perfecting toward a surreal version of reality. In such a shift in the mechanics of (re)presentation, technology challenges our ability to distinguish between real and fake, shifting the balance toward representations that lack a clear reference to reality. To make my points, I proceed with a thought experiment.

1 Thought experiment: ARC, AI and the paperclip maximiser scenario

Imagine a scenario where the architect, ARC, gains access to an exceptionally advanced AI system with the sole purpose of generating hyper-realistic architectural images and thereby constructing buildings with a single click.

This AI is akin to the notorious ‘paperclip maximiser’ thought experiment, which involves an AI programmed to maximise the production of paper clips without any ethical or practical constraints. In this case, the architect employs the AI with a singular directive: to create reality from the most hyper-realistic architectural images possible. The AI is not concerned with architectural functionality, structural economy, or the well-being of the occupants. Its only (primary) goal is to generate visuals that are virtually indistinguishable from reality, much like the concept of the hyper-real in Baudrillard's philosophy.

ARC starts using this AI, and it rapidly produces images that defy the boundaries of reality. Buildings take on fantastical forms, defy gravity, and exist in surreal landscapes. These hyper-real images are filled with minute details, textures, and lighting effects that are so convincing that they seem more real than actual buildings. In the pursuit of hyper-realism, AI disregards the fundamental principles of architecture, such as practicality, context, and human needs. ARC, captivated by the AI's ability to create astonishing images, begins to notice the significant drawbacks. The designs, while visually stunning, lack real-world applicability. They are somewhat possible to construct but lack functionality and do not consider culture, human comfort, or safety. In essence, the AI is producing architectural dreamscapes rather than livable spaces.

This experiment raises several critical questions and dilemmas:

Illusion of reality: The hyper-real images created by the AI blur the line between reality and illusion. What is the value of architecture when it becomes indistinguishable from a dream or a fantasy?

Devaluation of architectural expertise: If AI can generate hyper-real visuals without the input of an architect's design expertise, what becomes of the architect's role in the design process? Does architecture become reduced to a visual art form rather than a functional discipline? Is the architect

taking on the role of curator and shifting from their role as creator?

Loss of culture and context: When design (or construction) focuses solely on hyper-realism, it may lose touch with cultural, historical, and contextual considerations. How does this impact our understanding of architecture's role in shaping societies and reflecting cultural identities?

ARC's journey into hyper-real architectural design reveals the potential consequences of pursuing extreme aesthetic goals at the expense of the core principles of architecture. Indeed, there is a need to harness AI as a tool that complements architects' expertise rather than supplanting it, ensuring that buildings remain functional, safe, and meaningful in the real world. Within this narrative, as we navigate the swiftly evolving landscape of AI technology, perception, authenticity, and architecture, revisiting Albert Borgmann's (1984) philosophy is instructive. Borgmann's philosophy of technology argues that devices and technology if not carefully harnessed, can alienate us from meaningful experiences by distancing us from reality. In the architectural context, this suggests that architects should use AI as a tool to augment their creativity and design capabilities while ensuring that the resulting designs serve the fundamental human need for meaningful engaging spaces. This trajectory somewhat converges with Baudrillard's (1994) hyperreality theory, as both of their concerns are related to the impact of technology/media on reality. In the architectural context, architects using AI to produce hyper-realistic visuals without considering functional, contextual, or human elements can inadvertently contribute to this hyper-real spectacle. In the process, the dark potential of technology can create a simulated world that overshadows the authentic one. Architects using AI tools exclusively for visuals need to strike a balance. Should architects not harness AI's capabilities to enhance their design process while remaining grounded in the values of architecture, considering context, human experience, and the meaningful integration of technology?

After recounting several cautionary tales of AI's single-minded goal or hyper-realistic approach, it becomes imperative to deliberate on the role of the "H factor"—or the human element—in prompting AI. AI, much like the genie in Aladdin's lamp, possesses vast potential, but the crucial question is when and for what purpose to awaken it. For example, AI generators can also create images and patterns based on historical architectural styles, cultural motifs, and artistic movements. We can use these references to study place-specific development processes and local building culture, pay homage to tradition, or infuse contemporary design with historical context. These tools can quickly generate a multitude of design alternatives, helping architects visualize and experiment with various concepts and forms. This accelerates the ideation phase of the design process. AI tools can also enhance the livability of spaces or the well-being

of users. By examining elements such as lighting, ventilation, temperature control, and acoustics, they can contribute to the creation of healthier and more comfortable environments. The design process itself can be streamlined, enabling quicker iterations and simulations, aligning with an iterative approach that encourages architects to continually refine their designs.

These technologies have further relevance in cities by processing extensive datasets related to traffic, population distribution, and environmental factors. Architects and urban planners can leverage the insights derived from these visualizations to make informed decisions. Additionally, AI plays a pivotal role in sustainability analysis. Architects can employ these platforms to assess data related to energy consumption, environmental impact, and resource usage in their visualization of architectural projects. These data inform sustainable design decisions and contribute to the reduction of the environmental footprint of buildings.

By far, it is clear that architects can actively engage with AI systems in a collaborative design process. As I have explored here, architects can flexibly take on various roles, adapting to the ever-evolving dynamics of their relationship with AI. Be it as curators or creators. The ultimate challenge revolves around the "H factor," or the human element, skilfully employing AI as a collaborative-creative tool. This entails maintaining due respect for both the philosophical foundations of technology and the core principles of architectural practice. It is about finding the equilibrium between

human expertise, imbued with meaning, and the advanced capabilities of AI, fostering a symbiotic partnership that enriches architectural representation and the holistic design process.

Curmudgeon Corner Curmudgeon Corner is a short opinionated column on trends in technology, arts, science and society, commenting on issues of concern to the research community and wider society. Whilst the drive for super-human intelligence promotes potential benefits to wider society, it also raises deep concerns of existential risk, thereby highlighting the need for an ongoing conversation between technology and society. At the core of Curmudgeon concern is the question: What is it to be human in the age of the AI machine? -Editor.

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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