

Towards Intelligent Repair

Observations on AI and Architecture

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Not long ago, on March 24, Pope Francis appeared on the internet wearing a white down coat at once shiny and billowing, as if he had just bought the jacket in one of the many Italian fashion stores not far from the Vatican (Fig. 1). The stark contrast between apparent haute-couture and the person wearing it – between pop culture and catholic liturgy – gave rise to a slew of memes: the image went viral, deceiving a great many people who took it for real. Pope Francis, half rapper, half Michelin Man, appears to be striding across a public square whose blurry backdrop of classical architectural elements indicates urban scenery suggestive of Rome. Flooded with sunlight, the figure-ground relationship is heavily emphasised, setting the focus on the bright white coat rather than on the Pope or his environs.



Figure 1 – Pope Francis wearing down jacket. Image produced by Midjourney.

The Devil is in the Details

The swindle takes advantage of what is called attention economics, a person's limited ability to consume an abundance of information, a condition exacerbated by a profusion of images on social media. We scroll and browse and casually consume, yet upon closer examination, Francis' right hand, among other clues, betrayed the work's origin: Midjourney, the text-to-image artificial intelligence (AI) behind the forgery. As of yet, Midjourney can render many things utterly realistic, though human hands are still a tough nut to crack. With new iterations improving this shortcoming it might soon become

increasingly difficult to winnow what is true and significant from what is false and trivial. Someone used natural language to prompt this image of the Pope, making an AI draw from a large reservoir of already existing images from the web, huge datasets that give rise to such staggering concoctions through the hidden magic of complex algorithms that work their way through statistics and probability. Whatever the Pope wears in reality, this coat is surely not among his pieces.

Text-to-Image Platforms

Last year saw a surge of text-to-image platforms and chatbots like ChatGPT made accessible to a broader public. Users can use AI to generate deceptive images whose potential is growing by the minute. With ChatGPT, they can also have poems or essays written in the style of Hanna Arendt or Edgar Allan Poe, even if the underlying technology has no ability to distinguish impossibilities from actual possibilities.¹

This evolution makes some of us concerned and others optimistic, as it brings about hitherto unseen results, the most recent of which also include Donald Trump being arrested by the police. At the other end of the spectrum, right-wing populists utilise the very same tools for their racist propaganda.² Lately, users also began to cross-fertilise chatbots with text-to-image platforms, so as to employ the former for the latter.³ Clearly a disruptive technology, it is limited, however, to our collective memory – in fact only to the myriad images and texts publicly available in our vast archive – which also makes it less personal and thoughtful than accessing our own creative power. It is essentially a blender of already established ideas, a mix of fragments and information that AI was trained to harvest before weaving them together according to the prompt. AI might be good for yielding unexpected combinations. Yet if you can imagine something clearly in your mind, it might be better to draw or write it yourself.

AI Architecture

This also goes for architects, who have been increasingly drawn to these new platforms. Architecture, especially when unbuilt, is a discipline residing in images and texts. Whereas AI images depicting human beings often contain clues that unmask a fabricated fantasy – hand deformities, distorted faces in the background – photorealistic images of architecture tend to be more compelling: as a spatial discipline, architecture lends itself to the production of images. Although computer generated renderings have been around for years, the main difference to AI productions lies in their genesis: conventional renderings require a three-dimensional model of a structure to be visualised. There is, in other words, an idea of architecture behind them. By contrast, AI can generate an image without a reference object, a shift that comes at a price: it is currently impossible to generate different perspectives with different vantage points of the same thing. There is always only a perspective of something, but if something (in this case a model) no longer exists, there cannot be more than one image of it. What is more, architecture primarily comes to life through drawings and models, something text-based prompts and image generators are unable to produce. To test this, I sought to evoke an actual floor plan, prompting an “architectural drawing of an apartment floor

plan with four rooms for a shared community with a central kitchen and two bathrooms with windows” (Fig. 2). The result comes as no surprise: Midjourney produces images instead of drawings. Sometimes, the text-to-image translation can go awfully wrong, for instance when Midjourney twists semantics by taking certain words literally, as is the case with this image of a “calm office space for a literary scholar, good for writing, flooded with light” (Fig. 3).



Figure 2 – “Drawing” of floor plan for a shared apartment. Image produced by Midjourney.



Figure 3 – Office flooded with light. Image produced by Midjourney.

Besides some of the viral images like that of the Pope, there is a growing number of architectural fantasies generated by platforms like Midjourney, DALL E, or Stable Diffusion, often evoking the world of sci-fi. For reproducing what is already there, Midjourney is not the right tool: it comes only so close as one is able to describe an existing reference through words, with lots of room for interpretation, as is the case with every translation. With an eye to the former building of the Essener Creditanstalt – the new home for the College for Social Sciences and Humanities – the Midjourney prompt in this instance was to “imagine a building for a college for social sciences and humanities in a dense urban area in Western Germany in Neo-baroque style with a cupola above the entrance and pilasters at the corner flanking the main entrance” (Fig. 4). The result is a series of rather cartoonish images of a symmetrical Neo-baroque building some of us might have seen many times before. Refining the prompt does not automatically achieve higher fidelity: “Imagine a building with two floors for a college for social sciences and humanities in a dense urban area in Germany in Neo-baroque style with a vaulted cupola above the entrance and two pilasters at the corner flanking the

main entrance. The ground floor features horizontal banded rustication, the upper floor is smooth. Hyperrealistic image with global illumination, natural lighting, and a blue sky. Pedestrians pass by in front of the building” (Fig. 5).



Figure 4 – Four variations for a Neo-baroque college. Image produced by Midjourney.



Figure 5 – Design for a Neo-baroque college. Image produced by Midjourney.

Mimicry or Fantasy?

But why do this in the first place you may wonder? Why try to mimic something that already exists rather than imagining what is not yet there? Another of my prompts seeks to generate a more ingenious design for a new structure and reads as follows: “Eye-popping building for a college for social sciences and humanities located in a bustling city in Germany with many cars. A great place for scholars to think, with irregular rows of beady bubble windows emerging on the otherwise regular facade and enough spaces for lush gardens to sprout. Buttery yellow on the outside, pale blue on the inside. A roof terrace to relax and good sun protection. The main stairwell is visible from outside. Timber construction to make it environmentally friendly, and to soften the expression” (Fig. 6).



Figure 6 – Design for a new college. Image produced by Midjourney.

Though gaudy and playful, my initial curiosity about such results has already begun to fade, as many of these images have a mind-numbing effect: they often thrive on clichéd notions, stereotypes, and patterns, evoking certain styles formed by a set of building elements characteristic in their particular arrangement for one distinctive approach or period. Styles in prompts can have an effect on the design of the structure as much as on its visualisation, as becomes evident in the following rendering, which not only discloses a tongue-in-cheek approach to the architecture of Mies van der Rohe, but also seeks to mimic the photography of Julius Shulman, a famous American photographer best known for his black and white images of Californian modernist buildings (Fig. 7).



Figure 7 – Four variations of a museum designed by Mies van der Rohe with organic shapes growing from the ground. Image produced by Midjourney.

Repair, Reuse, Recycle

Currently, or so it seems, there are two trends in architectural discourse particularly at odds with each other. The first one is technological, a trend towards artificial intelligence, as sketched out above. The other is material and has to do with repair. Needless to say, what AI platforms such as Midjourney yield so far are pure visuals with no grounding in the material world. But what if architects began to adapt or reuse existing buildings instead of devising entirely new ones? What if they built new ones only with materials already available, either from dismantled buildings or surplus materials? Such questions are not new.⁴ Architectural discourse has recently begun to advocate for a shift in mentality, from the creation of new structures towards notions of repair, recovery, and recycling, in fact even suggesting a suspension of new constructions altogether.⁵ Here, repair can be understood as fixing a broken system and rethinking the status quo in order to improve it.⁶ This conception of repair is less retroactive than forward-looking

and it requires some grounding in material reality, a concrete situation and ways to improve it. This approach can address many different systems, from power grids on an urban scale to societal change towards more social justice, from a more equal distribution of wealth to the repair of individual buildings. Circular strategies entailing reuse and recycling understand buildings as resources for raw materials to be used at the end of a structure's life cycle. This so-called urban mining design thinks beyond the individual building as it tries to minimise the consumption of primary resources.⁷

To that end, buildings should be radically reconsidered in terms of their tectonics, their structure, and their insulation, thereby allowing the different parts and layers to come apart in later stages: design for disassembly. Buildings should be considered beyond just human life, as living organisms themselves. They should be permeable instead of hermetically sealed, and they should also react to the local climate. They should be taut and mellow, vibrant and soothing, but they shouldn't simply look like this or that. AI is not yet prepared to "think" (nor visualise) in these terms, as is evinced by this image of a "multi-storey apartment building created entirely from recycled materials and designed for future disassembly [...] with vibrant colours" (Fig. 8).



Figure 8 – Design for recycled apartment building. Image produced by Midjourney.

The creative outcome of text-to-image platforms – as curious it may be – fetishises the individual structure, rendered in one style or another. Yet the discourse in architecture has long transcended the hyper-stylised building understood as a finished object. Instead, buildings are conceived as a process, the discipline as a political practice, as a means to repair the already existing environment, and as a way to act upon climate change by challenging some of the energy paradigms deeply entrenched in the construction sector, which still heavily relies on extractive industries and the consumption of fossil fuels. This new attitude towards architecture is first and foremost material, as we have to think differently about our buildings, including those that already exist. They require and store energy, they are material assemblages put together in ways that are more than just aesthetic. The building sector produces enormous carbon emissions: the chemical process of making cement has a gargantuan carbon footprint. Timber constructions in turn are a large carbon sink, but for all this wood it takes way more trees.

What is therefore needed is a considerate distribution of resources to create an architecture at once resilient and energy-efficient. Also needed is a new aesthetics, that is, ways to give expression to a reconceptualised understanding of materiality in light of climate change and the potential of big data.⁸ What is required for projects of reuse, repair, and renewal is a transformation of a different kind: one that recombines the real with the fictitious, the existing with the yet-to-come. Beyond this initial excitement and playfulness of architectural images in the style of Tadao Ando, Zaha Hadid, or Francis Kéré, what is needed is an AI capable of allocating our limited resources, a process informed, for instance, by environmental economics. Unless we begin to harness AI beyond a project's early concept stage with its concomitant visualisations, and towards those more pressing social and economic concerns – repair, resource efficiency, life-cycle assessment of materials, design for disassembly, energy capture, affordable housing above all – it will remain a lovely tool capable of producing mind-boggling images, the excitement of which will fade rather soon. We don't need the puffer jacket Pope in architecture.

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